

**A statewide
assessment
of
health
disparities
by
race,
ethnic group,
poverty
and
education**

The
Health
of
Washington
State
2004 Supplement

September 2004

The Health of Washington State 2004 Supplement

**A statewide assessment
addressing health disparities
by race, ethnic group, poverty and education**

September 2004

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Introduction

Purpose

This *2004 Supplement* to the *2002 Health of Washington State* provides information on health indicators by race and ethnicity that was not included in the original document. The *2004 Supplement* also provides information on the relationship between health and two measures of socioeconomic status: poverty and education. These measures are included because differences in health attributed to race and ethnicity often change when such factors are taken into account.

Background

In July 2002, the Washington State Department of Health released the *2002 Health of Washington State*, which provided an overview of health status and related topics that are important to the Department's mission of protecting and improving health in Washington. Where possible, the *2002 Health of Washington State* included Washington data for several races and ethnic groups and also addressed issues related to economic factors and education. This was generally possible for chapters, such as those on Obesity and Overweight and Tobacco, that used survey data to describe health and related conditions. Chapters that relied on other data sets, such as death certificates, were not able to include information on race and ethnicity. The population data needed to calculate rates and allow comparisons among people in different racial and ethnic groups were not available. These data are now available, allowing us to supplement the information that was missing from the *2002 Health of Washington State*.

We developed the *2004 Supplement* to be used in conjunction with the *2002 Health of Washington State*. Thus, chapters in the 2002 document that contained Washington State data by race and ethnic group are not included in the *2004 Supplement*. For the chapters that are included, the reader will find additional information about specific health conditions in the corresponding chapter in the *2002 Health of Washington State*.

Interpreting the Data

Race and Ethnic Group

To interpret health data classified by race and ethnic group, one must consider issues related to data quality and to the meaning assigned to "race" and "ethnicity." Data quality varies depending on how information on race and ethnicity is collected and compiled, and the concept of race and ethnicity has changed over time.

Appendix B describes how information on race and ethnicity is recorded in each data source used in the *2002 Health of Washington State* and the *2004 Supplement*. This appendix also indicates how the recording of race and ethnicity might affect data interpretation. For example, the information on the Death Certificate System notes that the number of deaths for Asian and Pacific Islanders, American Indians and Alaska Natives, and Hispanics may be underestimated, because people in these groups are often reported as white and non-Hispanic on the death certificate. Thus, death rates for these groups might seem lower than they actually are, and this needs to be considered when interpreting the data.

Federal guidelines currently specify five racial categories: American Indian or Alaska Native, Asian, black or African American, Native Hawaiian or other Pacific Islander, and white. Until 1997, however, federal guidelines grouped Asians and Pacific Islanders (including Native Hawaiians) together. Additionally, current guidelines require that federal systems allow the reporting of more than one race. These changes took effect in Washington in 2003, but the data presented in the *2004 Supplement* precede the changes. Therefore, the *2004 Supplement* combines Asians and Pacific Islanders into one race group and provides data for single race only. In interpreting data, it is important to note that these broad groupings represent a diversity of cultures with different health-related social norms and practices.

Finally, the understanding of race and ethnic group in relation to health has changed over time. Due to

an increased understanding of the human genome, most scientists do not view race as a valid biological construct. Rather, race and ethnic group should be viewed primarily as capturing the effects of complex social, cultural, economic, and political factors on human health. These factors must be considered in interpreting health data.

Poverty

Economic resources and health are closely related. In general, more affluent people enjoy better health. The reasons for this relationship are complex and include factors such as the likelihood that people with more economic resources are more likely to live and work in environments that support healthy lifestyles, minimize exposure to toxic chemicals, and have relatively low levels of physical violence compared to people with fewer economic resources. People with more wealth are also better able to take advantage of medical services that prevent disease compared to those who are less affluent.

Several measures are commonly used to study the relationship between health and economic resources, including individual or household income, whether a person lives above or below the federal poverty level, and whether someone lives in a neighborhood characterized by high or low income or poverty. In this supplement, we measure economic resources as the proportion of people in a U.S. Census tract who live at or below the federal poverty level. Appendix A, Poverty provides additional detail on this measure, including a description of census tracts.

The percent of the population living in poverty describes the general economic level of persons in one's nearby community and the neighborhood context in which one lives. To some extent, the measure also describes individuals; people living in neighborhoods where a high proportion of the population is poor are more likely to be poor themselves compared to people who live in neighborhoods where there is less poverty.

We selected a contextual measure of poverty because individual economic measures are not readily available. We do not intend to place relatively greater importance on the context in which one lives compared to individual factors. Health researchers debate the relative importance for health of living in a poor neighborhood

compared to individual poverty, but evidence shows that both are important. In fact, some health researchers believe that one cannot really distinguish between individual and community factors, because "People create places, and places create people."¹

Education

Formal educational level is also closely related to health. Most commonly, people with higher levels of education enjoy better health status. In general, people with more education are more likely to avoid poverty, live in environments that support healthy lifestyles, work in occupations with less exposure to toxins and physical hazards, and be better able to take advantage of medical services to prevent disease compared to people with lower levels of education.

In this document, we have measured education as the proportion of adults, ages 25 and older, in a U.S. Census tract that completed college. Appendix A, Education provides additional detail on this measure, including a description of census tracts. Although the measure is based on the educational level of people ages 25 and older, the proportion is assigned to people of all ages in the census tract. The measure describes the general educational level of adults in a neighborhood, which contributes to the context in which people live, irrespective of their ages. To some extent, the measure also describes individuals; adults living in neighborhoods where a relatively large portion of the population has completed college are more likely to have completed college themselves, and children in these neighborhoods are more likely to have parents who have completed college, compared to people in neighborhoods where fewer adults have college degrees. As with poverty, we selected a contextual measure of education based on data availability and not with the intent of placing relatively greater importance on the context in which one lives compared to individual factors.

Relationships among race, ethnicity, poverty, and education

The Race and Hispanic Ethnicity section of Appendix A explains why we provide information by race and ethnic group and discusses issues related to interpreting these data. Additionally, as

described in the Guidelines for Using Racial and Ethnic Groups in Data Analyses, <http://www.doh.wa.gov/data/Guidelines/Raceguide1.htm>, differences in health status by race and ethnic group often change when socioeconomic factors are taken into account, because some race and ethnic groups carry a disproportionate burden of poverty and low levels of formal education.

The disproportionate burdens of poverty and low education are seen in Washington. The 2000 U.S. Census shows that in Washington, more than 25% of American Indians and Alaska Natives live in high poverty areas (defined as census tracts where 20% of people are at or below the federal poverty level), compared to less than 20% of African Americans and about 10% of Asians and Pacific Islanders and whites. More than 30% of Hispanics live in high poverty areas, compared to about 10% of non-Hispanics. Similarly, fewer than 10% of American Indians and Alaska Natives and Hispanics live in census tracts with the highest levels of education (defined as at least 40% of adults older than 25 having completed college), compared to about 15% of African Americans, about 20% of whites and non-Hispanics, and more than 25% of Asians and Pacific Islanders.²

The strong and complex relationships among economic factors, education, race and ethnic group, and related factors such as immigration status often make it difficult to disentangle the role each factor plays in relation to health. Due to data limitations, we were generally not able to assess the relative importance of these factors in Washington. Where possible, however, authors presented information on the relative importance of race, ethnic group, socioeconomic status, and related factors based on national or other data.

Reporting Conventions

Several reporting conventions in the *2004 Supplement* bear explanation.

Unless otherwise stated, we have used the terms “black” and “African American” interchangeably. In some chapters, the term “African American” specifically refers to persons born in the United States. In these instances, the text clearly specifies that the terms are not used interchangeably.

In many chapters, authors assessed racial disparities in comparison to whites. This convention was adopted because whites are the largest group in Washington, and so rates for whites do not fluctuate as much as rates for other races, making comparisons more reliable.

We have not used the term “statistically significant” to describe differences among races and ethnic groups, levels of poverty, or levels of education or to describe increases or decreases in rates over time. However, highlighted differences or changes are statistically significant unless otherwise stated.

While we have attempted to avoid using technical terms, we have been unable to avoid use of some of these terms in presenting health statistics. Information on technical terms is available in Appendix A.

For More Information

Appendix A, Race and Hispanic Ethnicity, and Appendix B, Census and Intercensal Interpolations, for additional technical information on federal guidelines and the recording of race and ethnicity in the data sets used in the 2004 Supplement.

Racial and Ethnic Groups in Data Analysis, <http://www.doh.wa.gov/data/Guidelines/Raceguide1.htm>, for additional information on the Washington State Department of Health’s guidelines for using race and ethnicity when analyzing health data.

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¹ Kawachi I and Berkman LF Introduction. In: Kawachi I and Berkman LF editors. *Neighborhoods and Health*. New York: Oxford University Press; 2003. p. 26.

² Data compiled by the Washington State Department of Health, Non-Infectious Conditions Epidemiology section, based on 2000 U.S. Census STF3 file, with people reporting more than one race assigned to single race groups using an algorithm similar to that used nationally.

Mortality and Life Expectancy

Summary

In Washington State and nationally, age-adjusted death rates are highest for African Americans and American Indians and Alaska Natives and lowest for Asians and Pacific Islanders. Additionally, African Americans and American Indians and Alaska Natives have lower life expectancies than people of other races. Hispanics have lower overall death rates than non-Hispanics. In Washington, death rates increase as the general educational attainment of people in the neighborhood decreases and as poverty increases.

Rates

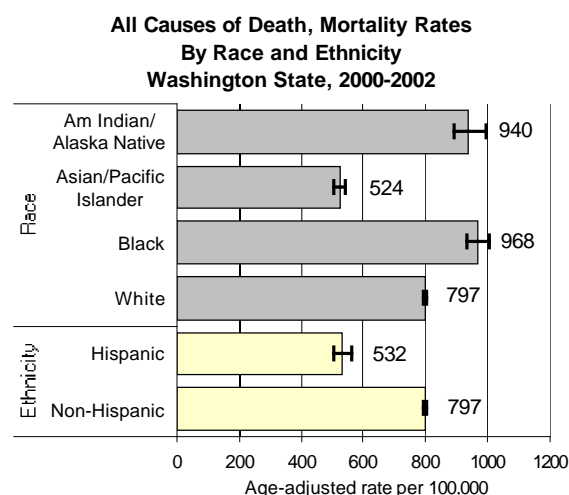
Race and Ethnicity

In Washington State during 2000 – 2002 combined, age-adjusted total death rates were lowest for Asians and Pacific Islanders and highest for American Indians and Alaska Natives and African Americans. Both nationally and in Washington, people who classify themselves as American Indian or Alaska Native are often reported as white on death certificates, resulting in an underestimated death rate.^{1,2} Thus, the true death rate for American Indians and Alaska Natives living in Washington is likely to be even higher than the rate shown below. To a lesser extent, national studies have also noted underreporting of accurate race or ethnicity for Asians and Pacific Islanders and Hispanics on death certificates,¹ but this phenomenon has not been studied in Washington. Based on national findings, however, actual death rates for Asians and Pacific Islanders and for Hispanics in Washington might be somewhat higher than those shown in the following chart. (See Appendix A, Race and Hispanic Ethnicity.)

Definition:

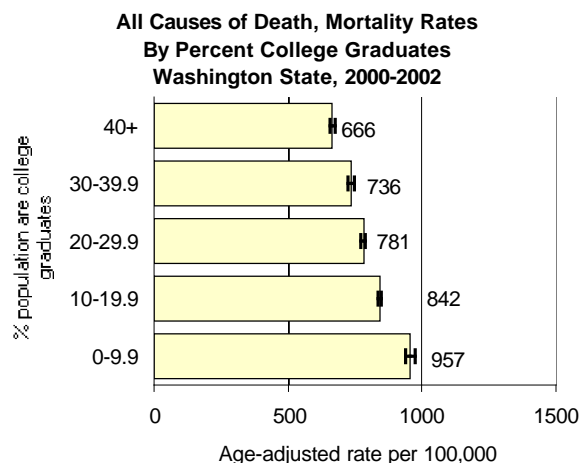
Mortality includes deaths from all causes in a given year. ICD-10 codes A00-Y99.

Life Expectancy is the number of years babies born in a given year can be expected to live if current age-specific death rates continue into the future.



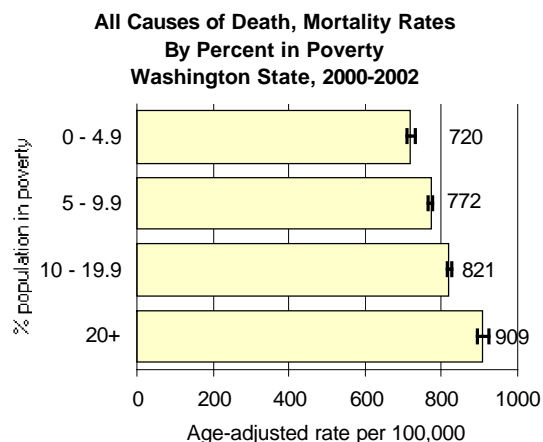
Education

To assess the association between death rates and education, we assigned an educational level to each decedent based on the percent of people age 25 and older with a college education in the census tract in which that person resided at death. (See Appendix A, Education.) In Washington from 2000 – 2002 combined, people living in census tracts where less than 10% of the population completed college had an age-adjusted death rate that was about 1.5 times higher than people living in census tracts where at least 40% of the population completed college. Additionally, for each 10 percentage-point decrease in the proportion of college graduates, death rates increased. In general, people with more formal education have lower death rates than people with less formal education, because they are more likely to avoid high-risk health behaviors, to live in environments that support healthy life styles, to work in occupations with less exposure to toxins and physical hazards, and to be better able take advantage of medical services to prevent disease compared to people with lower levels of education.³



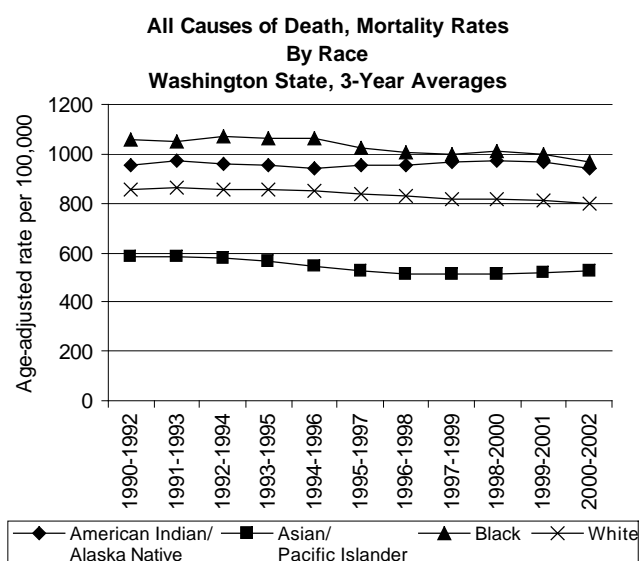
Poverty

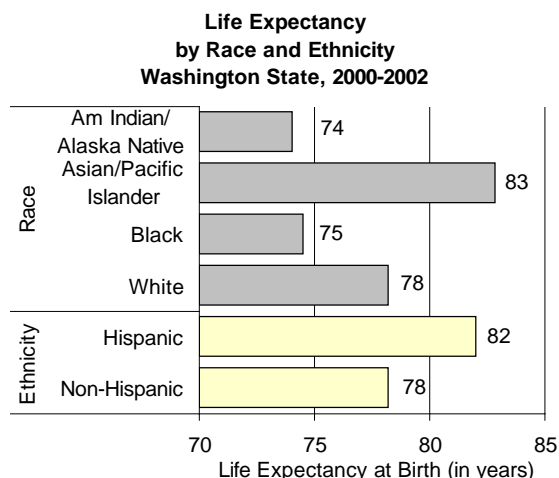
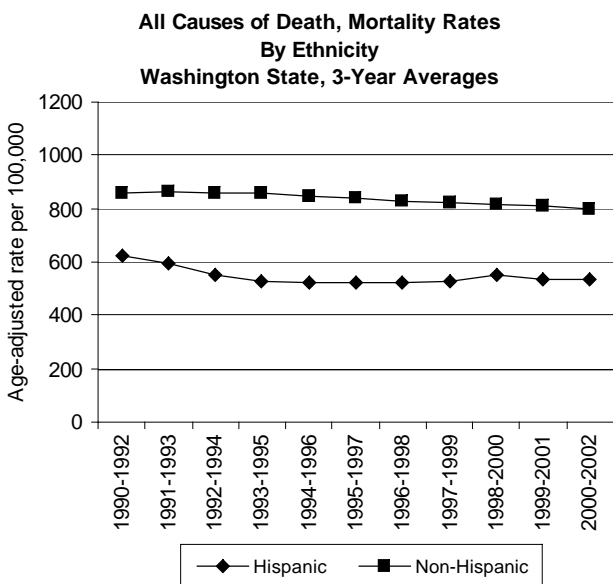
To study the link between poverty and death rates, we measured poverty as the percent of the population living at or below the federal poverty level in the census tract in which the decedent resided at death. (See Appendix A, Poverty.) In Washington during 2000 – 2002 combined, people living in census tracts where at least 20% of the population lived in poverty had an age-adjusted total death rate about 1.3 times higher than people living in census tracts where fewer than 5% lived in poverty. Additionally, as the proportion of people in poverty increased, death rates also increased. Many studies have documented a relationship between increased rates of death and being poor and/or living in high-poverty areas independent of individual economic resources.⁴ The reasons for these relationships are complex, but in general, people with more money or living in areas where there is less poverty are more likely to avoid high-risk health behaviors; to live in environments that support healthy life styles, minimize exposure to toxic chemicals, and have relatively low levels of physical violence; and are better able to take advantage of medical services to prevent disease.³



Trends

Since 1990, Asians and Pacific Islanders have consistently had the lowest overall death rates in Washington. African Americans had the highest death rates throughout the 1990s, but recently, rates for American Indians and Alaska Natives have converged with those for African Americans. Disparities may be increasing. Since 1990, death rates for Asians and Pacific Islanders and for whites have been decreasing about 2% and 1% each year, respectively. Rates for African Americans and for American Indians and Alaska Natives have remained constant. Death rates for both Hispanics and non-Hispanics have decreased over time. Hispanic rates decreased about 4% each year through 1996 and have remained constant since then. Rates for non-Hispanics have been decreasing about 1% each year. (See Appendix A, Trend Analysis.)





Life Expectancy at Birth

In Washington during 2000 – 2002, Asians and Pacific Islanders had the highest life expectancy (83 years), followed by whites (78 years), and African Americans (75 years). American Indians and Alaska Natives had the lowest life expectancy at 74 years. The National Center for Health Statistics provides national data on life expectancy only for African Americans and whites. In 2002, life expectancies for African Americans and whites were 73 years and 78 years, respectively.⁵ The American Indian Health Commission for Washington State noted several important factors contributing to the relatively low life expectancy for American Indians and Alaska Natives in Washington, including high rates of diabetes, stroke, chronic liver disease, and violence.² Nationally, major contributors to the relatively low life expectancy for African Americans include heart disease, cancer, and homicide.⁶

For More Information

Mortality and Life Expectancy Chapter, *2002 Health of Washington State*,
http://www.doh.wa.gov/HWS/doc/GHS/GHS_Death.doc.

Data Sources (For additional detail, see Appendix B.)

State death data: Vital Registration System Annual Statistical Files, Washington State Deaths 1980-2002, CD-ROM issued November 2003.

Population data for race and ethnicity: U.S. Census for 1990; National Center for Health Statistics bridged race population counts for 2000, 2001 and 2002; Public Health – Seattle & King County intercensal interpolations for 1991 – 1999, EPE Unit, February 2003.

Population data for education and poverty: U.S. Census 2000 Summary File 3, Tables P37 and P87 available through American Fact Finder,
http://factfinder.census.gov/home/saff/main.html?_lang=en.
 Downloaded December 2003.

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¹ U.S. Centers for Disease Control and Prevention, National Center for Health Statistics. Vital and Health Statistics (Series 2, Number 128), Quality of Death Rates by Race and Hispanic Origin: A Summary of Current Research, 1999. U.S. Department of Health and Human Services

² American Indian Health Commission for Washington State. Working Together to Build A Healthy Future: The 2003 American Indian Health Care Delivery Plan; July, 2003; 29-46.

³ Washington State Department of Health. Social Determinants of Health. In, Hale C, editor. The Health of Washington State; 2003. pp37-42.

⁴ Kawachi I and Berkman LF Introduction. In: Kawachi I and Berkman LF editors. Neighborhoods and Health. New York: Oxford University Press; 2003.

⁵ Kochanek KD, Smith BL. Deaths: Preliminary Data for 2002. National vital statistics reports; vol. 52, no. 13. Hyattsville, Maryland: National Center for Health Statistics, 2004.

⁶ Potter L Influence of homicide on racial disparity in life expectancy –United States, 1998. *MMWR* 2001;50(36):780-3.

Infectious Disease

Key Findings

In Washington State, infectious disease rates reveal racial, ethnic, and socioeconomic disparities, which are influenced by different factors. Infectious diseases, more than any other health conditions, illustrate how connected the world community has become. Tuberculosis rates are much higher outside the United States, such as in Asia, Africa, and Latin America, and these high rates affect disease rates in Washington. Individuals who are foreign-born are disproportionately affected with tuberculosis, particularly Asians and Pacific Islanders, who have the highest rates. Rates are also higher in Hispanics than in non-Hispanics. Hepatitis A rates are also higher in Hispanics than non-Hispanics. This situation may be associated with travel to and living with people from developing countries, where hepatitis A is common. HIV/AIDS rates are higher in African Americans than any other racial group, and while the majority of cases are from the United States, African-born blacks who were likely infected before coming to this country comprise an increasing proportion of Washington cases.

While racial and ethnic disparities may be influenced by infectious disease rates in other parts of the world, the living situations and life experiences of those who live here also affect these rates. In general, infectious disease rates are higher in African Americans, American Indians and Alaska Natives, and those of Hispanic ethnicity than in whites and non-Hispanics—although for some diseases, it is difficult to interpret racial differences because of incomplete data. In most cases, higher disease rates are associated with lower educational levels and higher levels of poverty. Situations such as unstable or crowded living conditions (such as homeless shelters), poor hygiene, and drug use contribute to higher disease rates.

These chapters demonstrate that for some infectious diseases, disparities between different racial and ethnic groups are decreasing. For example, disparities in rates of hepatitis A and B

have been decreasing, probably as a result of immunization programs that target individuals at high risk for disease. For other diseases, disparities are increasing. This is the case for tuberculosis and HIV/AIDS, for which disparities are increasing between African Americans and whites. These widening disparities indicate that additional work is needed in understanding culturally appropriate methods for disease prevention activities.

Chapters Excluded

This section does not include all of the chapters in the Infectious Disease section of the *2002 Health of Washington State*. Those that are excluded are

- Dental Caries
- Childhood and Adult Immunizations
- Sexually Transmitted Diseases
- Antibiotic-Resistant Infections
- Emerging Infectious Diseases

The chapters on dental caries and immunizations included in the previous document contain information from survey data that points to some racial, ethnic, and socioeconomic disparities in disease rates and access to services. For some diseases, such as antibiotic-resistant infections and several of the emerging infectious diseases, too few cases were reported to allow analysis by race and ethnic group. For other diseases, information on race and ethnicity was too incomplete to allow accurate analysis. For sexually transmitted diseases, about 20% of case reports are missing race information, and almost 30% are missing ethnicity. For hepatitis C (classified as an emerging infection in the previous document), nearly half of the case reports lack information on race and ethnicity.

Interventions

Intervention strategies for preventing infectious diseases have only been included in the *2004 Supplement* if they are different from those discussed in the *2002 Health of Washington State*. However, to the extent that infectious diseases are associated with poor access to medical care, overcrowded housing, and drug use, addressing

these issues would be expected to decrease relatively high rates of infectious diseases for people living in poorer neighborhoods and for those with less formal education. Improved access to culturally appropriate preventive services might also decrease some of the racial and ethnic disparities noted in these chapters.

HIV/AIDS

Definition: Infection with human immunodeficiency virus (HIV) results in a variety of manifestations becoming progressively more severe over time and usually ending in death. AIDS, as defined by CDC, includes HIV-infected persons with severe immunodeficiency (CD4 lymphocyte count < 200 cells/ μ l or <14% of total lymphocytes) and/or one of 26 opportunistic infections (e.g. *Pneumocystis carinii* pneumonia), neoplasms (Kaposi's sarcoma) or other indicator conditions (e.g. wasting syndrome).¹ ICD-10 codes B20-B24, R75

Summary

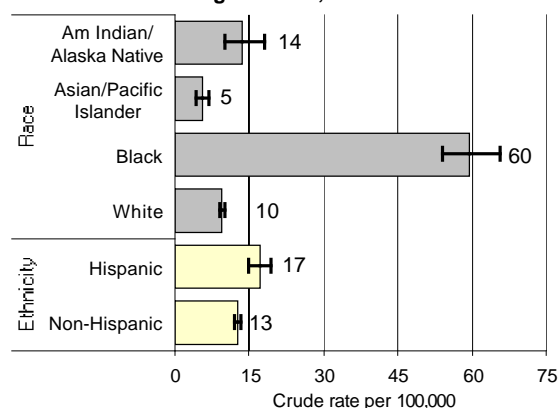
In Washington State, incidence rates for HIV/AIDS are higher among African Americans and American Indians and Alaska Natives compared to whites. The disparity in HIV rates between African Americans and whites has been increasing since the mid-1990s. Rates are also higher for Hispanics compared to non-Hispanics, but this disparity has remained relatively stable over time. Nationally estimated AIDS case rates are similar to Washington State's HIV/AIDS case rates in that rates for African Americans and American Indians and Alaska Natives are higher than rates for whites, with the greatest disparity between African Americans and whites.² Studies have found a direct relationship between higher incidence of AIDS and lower income.³

Rates

Race and Ethnicity

In Washington State, crude incidence rates for HIV/AIDS for 2000 – 2002 combined were higher among African Americans and American Indians and Alaska Natives compared to whites. Over the past three years, African Americans had an HIV/AIDS case rate that was more than six times that of the rate for whites. The crude incidence rate for Hispanics is higher than for non-Hispanics. Washington data are similar to national data in that the most dramatic disparity in disease rates is between African Americans and whites. For nationally estimated AIDS case rates for 2002, the case rate for African Americans was nearly 11 times the case rate for whites.²

**HIV/AIDS, Incidence Rates
By Race and Ethnicity
Washington State, 2000-2002**



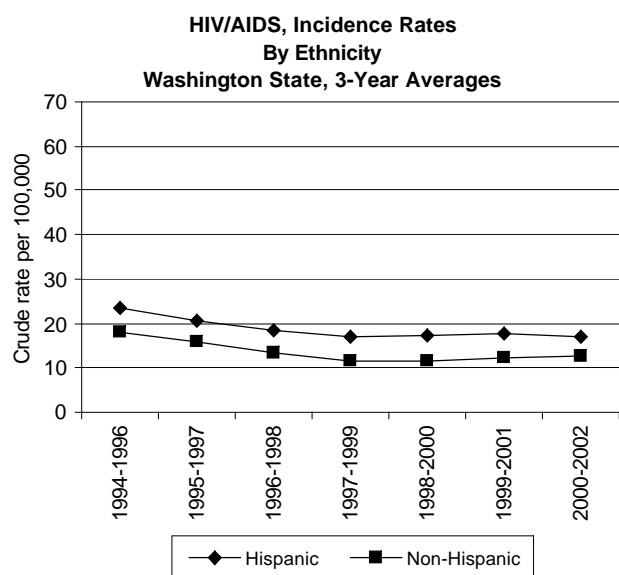
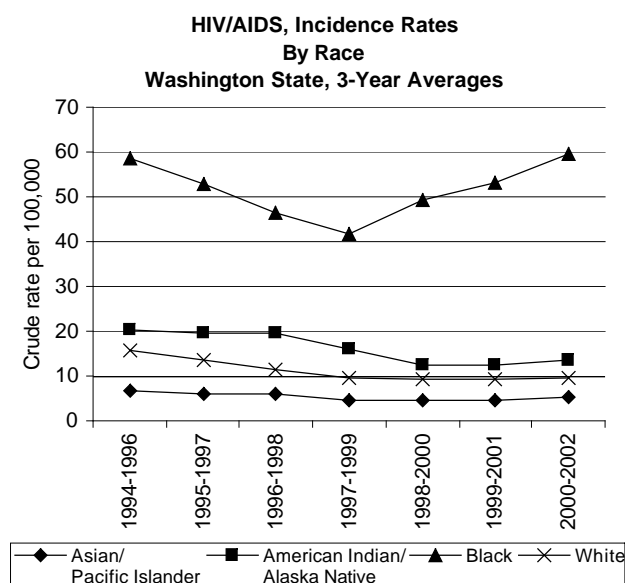
Education and Poverty

It is not possible to assign information on educational level or poverty to people reported with HIV/AIDS using the methods developed for the 2004 *Supplement*, because HIV/AIDS case report forms do not include street addresses. Studies done elsewhere in the United States have found a direct relationship between higher incidence of AIDS and lower income.³ Lower socioeconomic status may directly or indirectly increase HIV risks by limiting access to HIV-related prevention services and health care. (See Appendix A, Education, Poverty.)

Trends

In Washington State, the trend in HIV/AIDS diagnoses in African Americans differs dramatically from the trends in other racial groups. Trends in rates of HIV/AIDS diagnoses for whites, American Indians and Alaska Natives, and Asians and Pacific Islanders have been similar since the mid-1990s. Case rates for African Americans decreased until the late 1990s, but they have increased in recent years, widening the disparity between rates for African Americans and whites.

The trends for Hispanics and non-Hispanics have been similar over time. Comparable national trend data are not available for comparison; however, as is the case in Washington, African Americans comprise an increasing proportion of recently diagnosed HIV and AIDS cases.² (See Appendix A, Trend Analysis.)



Other Measures of Impact and Burden

There are a number of reasons why African Americans may be so disproportionately affected by HIV/AIDS in Washington State and nationally. In addition to socioeconomic conditions that may

decrease access to HIV prevention services, existing services may not appropriately target the population. The majority of African American men with HIV/AIDS in Washington acquired HIV by having sex with other men. But studies have shown that many African American men who have sex with men do not identify themselves as homosexual.⁴ This phenomenon may contribute to the even more disproportionate rate of HIV/AIDS in African American women, some of whom may have sexual partners who have sex with both men and women. African Americans of both sexes also have the highest rates of other sexually transmitted diseases in Washington State,⁵ which may contribute to the increased spread of HIV.

In addition, HIV/AIDS surveillance data from Seattle and King County indicate that an increasing proportion of blacks living with HIV/AIDS were born outside of the United States, primarily in African countries where HIV infection rates are high.⁶ The majority of HIV infections in this population were acquired through heterosexual transmission. Surveillance data do not include information about when people moved to the United States, but given the heterosexual nature of the epidemic in Africa, the similarity in risk pattern suggests that foreign-born blacks acquired their HIV infection prior to moving to the United States.

For More Information

HWS/AIDS Chapter, *2002 Health of Washington State*
http://www.doh.wa.gov/HWS/doc/ID/ID_HIV.doc

Washington State Department of Health, Infectious Disease and Reproductive Health Assessment Unit, (360) 236-3455.

Data Sources (For additional detail, see Appendix B.)

Population data for race and ethnicity: National Center for Health Statistics bridged race population counts for 2000, 2001 and 2002; Public Health – Seattle & King County intercensal interpolations for 1994 – 1999, EPE Unit, February 2003.

State HIV/AIDS data: Washington State Department of Health, Infectious Disease and Reproductive Health Assessment Unit, HIV/AIDS Reporting System (HARS)

National HIV/AIDS data: Centers for Disease Control and Prevention, Division of HIV/AIDS Prevention

Technical Notes

AIDS has been a reportable condition in Washington State since 1983; asymptomatic HIV has been reportable since September 1999. For this report, data for all stages of HIV disease have been

included for Washington State. Comparable data are not available at the national level at this time.

References

¹ U.S. Centers for Disease Control and Prevention: Guidelines for national immunodeficiency virus case surveillance, including monitoring for human immunodeficiency virus infection and acquired immunodeficiency syndrome. MMWR 1999;48(RR-13):29-31.

² U.S. Centers for Disease Control and Prevention. HIV/AIDS Surveillance Report 2002;14:14. Also available at <http://www.cdc.gov/hiv/stats/hasrlink.htm>.

³ Diaz T, Chu S, Buehler J, et al. Socioeconomic differences among people with AIDS: Results from a multistate surveillance project. Am J Prev Med 1994;10(4):217-222.

⁴ U.S. Centers for Disease Control and Prevention. HIV/STD risks in young men who have sex with men who do not disclose their sexual orientation – six U.S. cities, 1994-2000. MMWR 2003;52:81-100.

⁵ Washington State Department of Health. 2003 Sexually Transmitted Disease Morbidity. March 2004.

⁶ Wood B and Eteni D. The African Immigrant Project – July 2003. Washington State/Seattle King County HIV/AIDS Epidemiology Report. First half 2003;62:39-43.

Tuberculosis

Summary

In Washington State, incidence rates for tuberculosis are higher among Asians and Pacific Islanders, African Americans, and American Indians and Alaska Natives compared to whites. The disparity between African Americans and whites has been increasing since the mid-1990s. Rates are higher for Hispanics compared to non-Hispanics, but this disparity has been decreasing. The increase in rates for African Americans and the decrease for Hispanics observed in Washington is also seen nationally.¹ Tuberculosis disproportionately affects persons among foreign-born populations, particularly Asians and Pacific Islanders. Research suggests a strong association between tuberculosis and poverty, lower educational attainment, and unemployment. Low educational levels and unstable housing also make it difficult to maintain rigorous treatment regimens for at least six continuous months.²

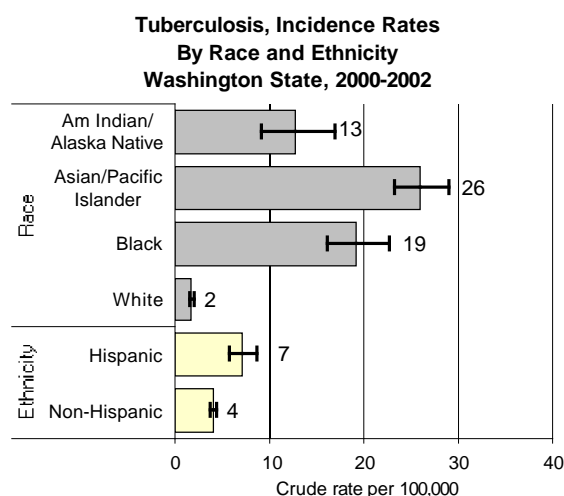
Rates

Race and Ethnicity

In Washington State, crude incidence rates for tuberculosis during 2000 – 2002 combined were higher among Asians and Pacific Islanders, African Americans, and American Indians and Alaska Natives compared to whites. Over the three years, Asians and Pacific Islanders had a case rate that was more than 15 times higher than the rate for whites, while African Americans had a case rate 11 times higher than that of whites. The crude incidence rate for Hispanics was higher than for non-Hispanics. The relatively high rates for Washington's Asian and Pacific Islander and Hispanic populations may be partly due to the large proportion of persons in these groups who are born outside the United States (see Other Measures of Burden). Poverty may also play an important role among African Americans,

Definition: TB disease is an infectious, inflammatory communicable disease that most commonly attacks the lungs, although it can occur in almost any part of the body. The causative agent, the tubercle bacillus (*Mycobacterium tuberculosis*), is spread through airborne transmission. ICD-10 codes A16-A19. Persons who have a positive tuberculin skin test but no clinical or radiographic evidence of TB are considered to have latent TB infection (LTBI) and are non-infectious.

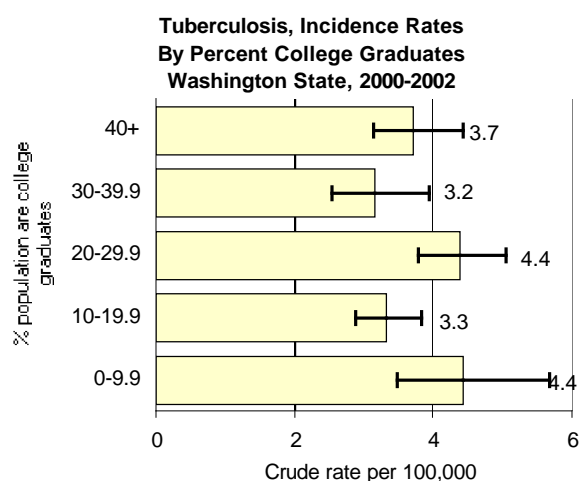
American Indians and Alaska Natives, and Hispanics who are disproportionately affected by poverty in Washington. (See Appendix A, Poverty.) While Hispanics in Washington have a relatively high rate of tuberculosis compared to non-Hispanics in Washington, their rates are relatively low compared to Hispanics nationally. During 2000 – 2002, the national tuberculosis rate for Hispanics was more than double the rate for Hispanics in Washington (15/100,000 compared to 7/100,000).³ (See Appendix A, Race and Hispanic Ethnicity.)



Education

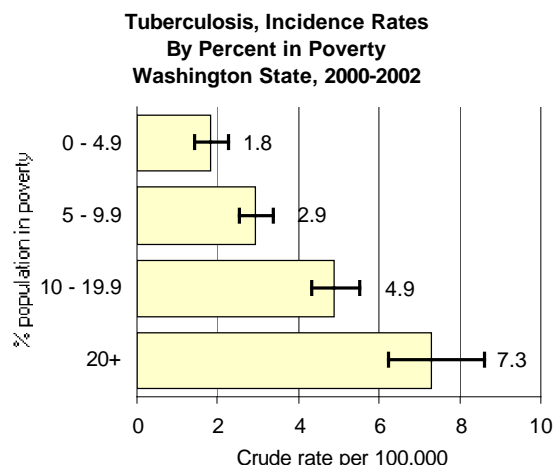
To assess the association between education and tuberculosis, we assigned an educational level to each person with tuberculosis based on the percent of people age 25 and older with a college education in the census tract in which the person lived when reported. (See Appendix A, Education.) In Washington for 2000 – 2002 combined, rates of tuberculosis were similar regardless of educational level. This finding differs from the association of higher rates of tuberculosis with lower educational attainment seen nationally.² This difference might indicate different patterns in Washington, but it might also reflect the inability of the education measure used

in this report to detect such differences. The latter would be true if individual educational level were more important than the general educational level of people in one's neighborhood. For example, in 2002, an outbreak of tuberculosis was reported among the homeless population in King County, which may not reflect the general educational levels for that specific area.



Poverty

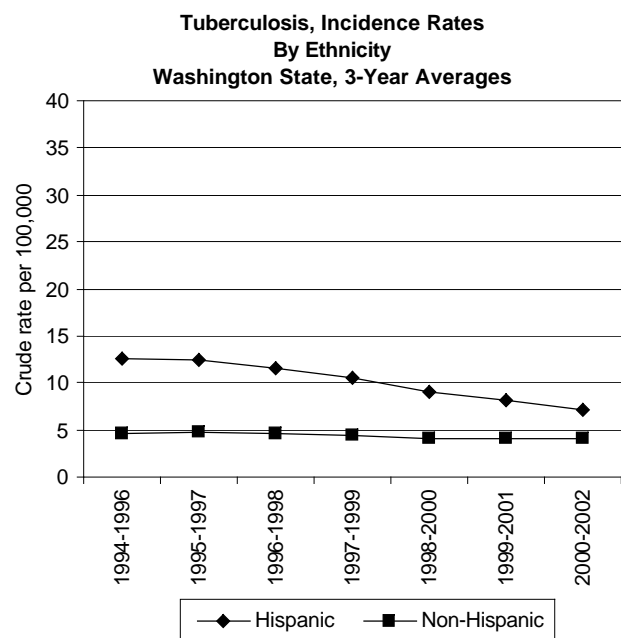
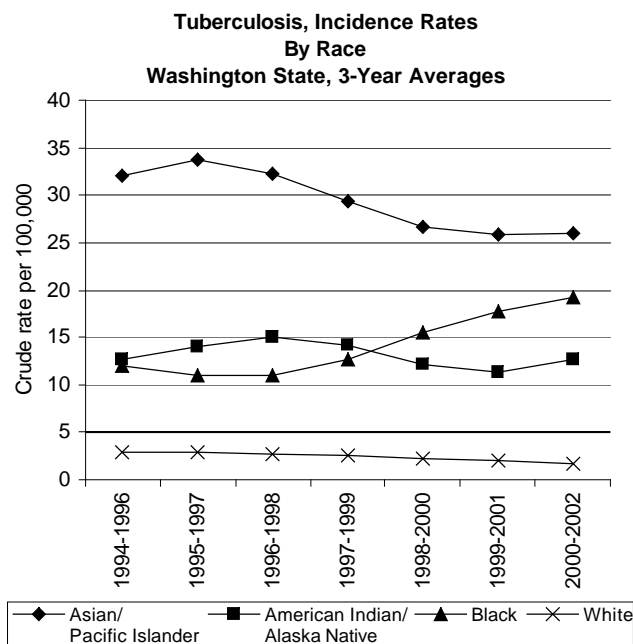
To study the link between poverty and tuberculosis, we measured poverty as the percent of the population living at or below the federal poverty level in the census tract in which the person resided when reported as having tuberculosis. (See Appendix A, Poverty.) In Washington for 2000 – 2002 combined, the greater the proportion of people living in poverty, the higher the incidence rate of tuberculosis. Additionally, as a result of the on-going outbreak among homeless persons in King County, the average number of people with tuberculosis reporting unemployment for at least 24 months during 2000 – 2002 was nearly twice as high as in the previous three years (an average of 41 people each year during 2000 – 2002 compared to 25 annually for 1997 – 1999).⁴ Research suggests overcrowding and poor ventilation, lack of access to health care or transportation to maintain a rigorous treatment regimen, language barriers, and cultural differences may contribute to the association between poverty and tuberculosis.²



Trends

In Washington State, trends in tuberculosis rates among different races and ethnic groups reflect national trends. Asians and Pacific Islanders continue to have higher crude incidence rates than other racial and ethnic groups. Increasing rates for African Americans and decreasing rates for Hispanics also reflect national trends. (See Appendix A, Trend Analysis.)

Overall, national declines in tuberculosis incidence conceal increasing incidence rates resulting in wider disparities for U.S.-born African Americans and foreign-born Asians and Pacific Islanders. Persons in these groups now account for the majority of people newly diagnosed with tuberculosis in the United States.¹ Research suggests an association between low socioeconomic status and the increase in cases among African Americans.²



Other Measures of Impact and Burden

Tuberculosis rates among foreign-born individuals remain disproportionately high in Washington State. Persons born outside the United States accounted for 70% of all Washington cases during 2000 – 2002. The majority of these persons came from areas of the world where tuberculosis is common, such as Asia, Africa, and Latin America.

Nationally, rates have declined in both the U.S.-born and the foreign-born populations. But the decline was substantially less among foreign-born populations, and the ratio of foreign-born to U.S.-born rates doubled, from about four in 1992 to eight in 2002. In 2002, for the first time, the number of foreign-born persons reported with tuberculosis accounted for the majority (51%) of cases in the United States.¹

For More Information

Tuberculosis Chapter, *2002 Health of Washington State*, http://www.doh.wa.gov/HWS/doc/ID/ID_TB.doc

Washington State Department of Health, Tuberculosis Control Program website: <http://www.doh.wa.gov/cfh/tb/>

Washington State Department of Health, Tuberculosis Control Program, (360) 236-3443.

Data Sources (For additional detail, see Appendix B.)

Population data for race and ethnicity: National Center for Health Statistics bridged race population counts for 2000, 2001 and 2002; Public Health – Seattle & King County intercensal interpolations for 1994 – 1999, EPE Unit, February 2003.

Tuberculosis data: Washington State Tuberculosis Information Management System (TIMS), 1994 – 2002.

National Tuberculosis data: Centers of Disease Control and Prevention Division of Tuberculosis Elimination (DTBE): Surveillance Reports, 2000 – 2002.

Population data for education and poverty: US Census 2000 Summary File 3, Tables P37 and P87 available through American Fact Finder, http://factfinder.census.gov/home/saff/main.html?_lang=en. Downloaded December 2003.

Technical Notes

The term foreign-born is applied to any person born outside the United States, American Samoa, Federated States of Micronesia, Guam, Marshall Islands, Midway Island, Northern Mariana Islands, Puerto Rico, Republic of Palau, U.S. Minor Outlying Islands, U.S. Miscellaneous Pacific Islands, and U.S. Virgin Islands.

References

- ¹ U.S. Centers for Disease Control and Prevention. Reported Tuberculosis in the United States, 2002. Atlanta, GA: U.S. Department of Health and Human Services, CDC, September 2003.
- ² U.S. Centers for Disease Control and Prevention. The Social and Cultural Dimensions of Health-Seeking Behaviors, 2003. Atlanta, GA: U.S. Division of TB Elimination, CDC Fall 2003.
- ³ U.S. Centers for Disease Control and Prevention. Reported Tuberculosis in the United States, 2000. Atlanta, GA: U.S. Department of Health and Human Services, CDC, August 2000, 2001, 2002.
- ⁴ Washington State Department of Health [Washington State TB Epidemiologic Profile](#). Department of Health, Office of Infectious Disease and Reproductive Health, Assessment Unit, 2003.

Meningococcal Disease

Definition: Severe bacterial infections with *Neisseria meningitidis* in a normally sterile site, in the blood (meningococcemia), or the cerebral spinal fluid surrounding the brain (meningococcal meningitis). Infection may be due to various serogroups including A, B, C, and others. ICD-9 codes 036.0-036.9.

Summary

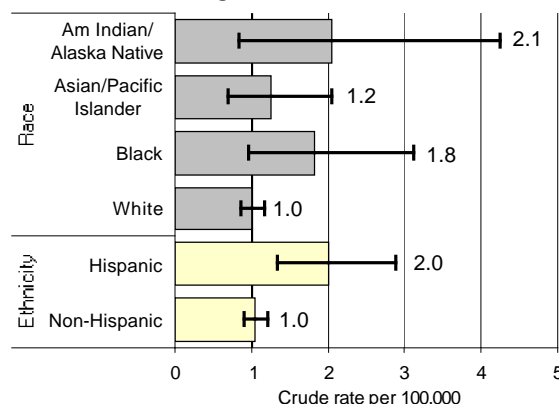
Meningococcal disease is transmitted by the respiratory route. Nationally, persons of lower socioeconomic position and higher exposure to tobacco smoke have higher rates of meningococcal disease. Rates are also higher among racial and ethnic groups that may be disproportionately represented in low socioeconomic groups or have relatively high exposure to tobacco smoke. In Washington during 2000 – 2002 combined, disparities among groups were most pronounced for people living in high-poverty areas compared to those living in relatively low-poverty areas, while disparities by race and education are less pronounced. Rates for Hispanics are higher than those for non-Hispanics. Additionally, large disparities between American Indians and Alaska Natives and people in other race groups that were apparent in the mid-1990s have decreased substantially in more recent years.

Rates

Race and Ethnicity

Race and ethnicity data are incomplete for many disease reports received in Washington, and as a result, interpretation of differences in disease rates between groups is difficult. In Washington during 2000 – 2002 combined, the crude rates of meningococcal disease were similar for persons in all race groups, but persons of Hispanic ethnicity had higher rates than non-Hispanics. Nationally, higher rates occur among African Americans, probably reflecting risk factors such as crowding or exposure to tobacco smoke.¹ (See Appendix A, Race and Hispanic Ethnicity.)

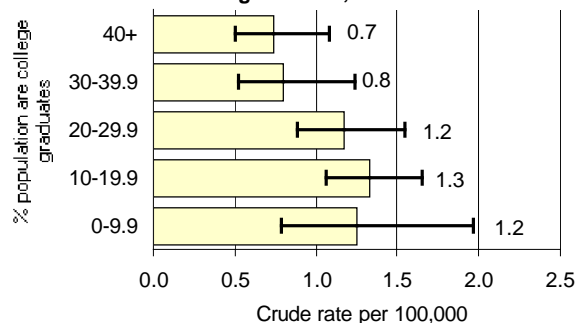
**Meningococcal Disease, Incidence Rates
By Race and Ethnicity
Washington State, 2000-2002**



Education

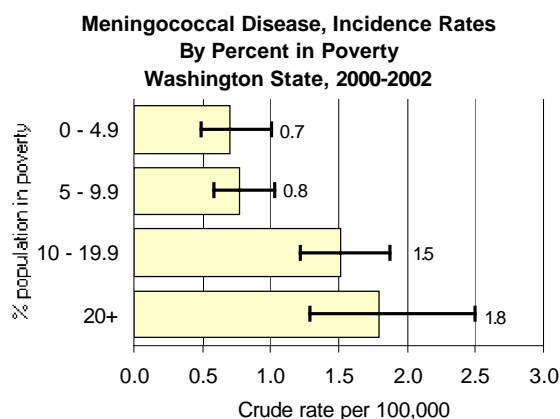
To assess the association between education and meningococcal disease, we assigned an educational level to each person with meningococcal disease based on the percent of people age 25 and older with a college degree in the census tract in which the person lived when reported. (See Appendix A, Education.) In Washington during 2000 – 2002 combined, there were no pronounced differences in rates of meningococcal disease by educational level, but rates tended to increase as the proportion of the population that completed college decreased.

**Meningococcal Disease, Incidence Rates
By Percent College Graduates
Washington State, 2000-2002**



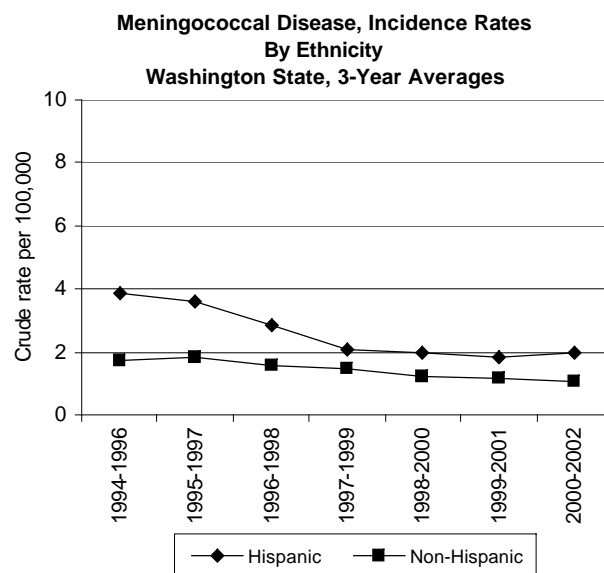
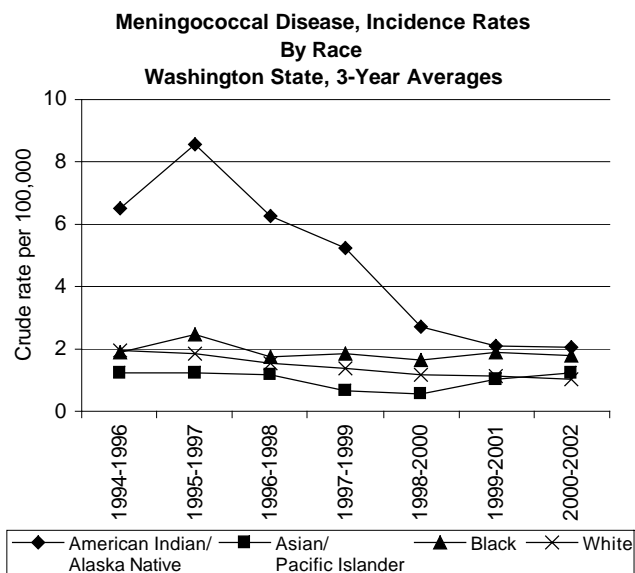
Poverty

To study the link between poverty and meningococcal disease, we measured poverty as the percent of the population living at or below the federal poverty level in the census tract in which the person lived when reported with meningococcal disease. (See Appendix A, Poverty.) In Washington during 2000 – 2002 combined, reported rates of meningococcal disease were about twice as high in areas where at least 10% of the population lived in poverty compared to areas with less poverty. Lower socioeconomic status may increase risk through household crowding, urban residence, or exposure to tobacco smoke.²



Trends

In recent years, national rates of meningococcal disease have been about 1 per 100,000. While rates in Washington have been consistently higher than national rates,³ all groups except Asians and Pacific Islanders and African Americans have shown declines since 1994. Additionally, the disparity between American Indians and Alaska Natives and other race groups has narrowed. The reason for this decline is not known, but it could reflect changes in circulating strains or long term disease cycles. (See Appendix A, Trend Analysis.)



For More Information

Meningococcal Chapter, 2000 Health of Washington State, http://www.doh.wa.gov/HWS/doc/ID/ID_MEN.doc.

Data Sources (For additional detail, see Appendix B.)

1994-2002 Annual Communicable Disease Reports. Washington State Department of Health.

Population data for race and ethnicity: National Center for Health Statistics bridged race population counts for 2000, 2001 and 2002; Public Health – Seattle & King County intercensal interpolations for 1994 – 1999, EPE Unit, February 2003.

Population data for education and poverty: U.S. Census 2000 Summary File 3, Tables P37 and P87 available through American Fact Finder,

http://factfinder.census.gov/home/saff/main.html?_lang=en.
Downloaded December 2003.

References

¹Raghunathan PL, Bernhardt SA, Rosenstein NE. Opportunities for Control of Meningococcal Disease in the United States. *Ann Rev Med* 2004;55:333-353.

² Rosenstein NE, Perkins BA, Stephens DS, et al. Meningococcal Disease. *NEJM* 2001;344:1378-88.

³ U.S. Centers for Disease Control and Prevention. Meningococcal statistics.

Hepatitis A

Definition: Viral infection of the liver with symptoms ranging from none to severe jaundice. Clinical illness usually resolves completely after several months but rarely is complicated by fulminant or relapsing infection. Virus excretion is intestinal, and inadequate sanitation results in transmission through food, water, or direct contact. ICD-9-CM codes 070.0 and 070.1

Summary

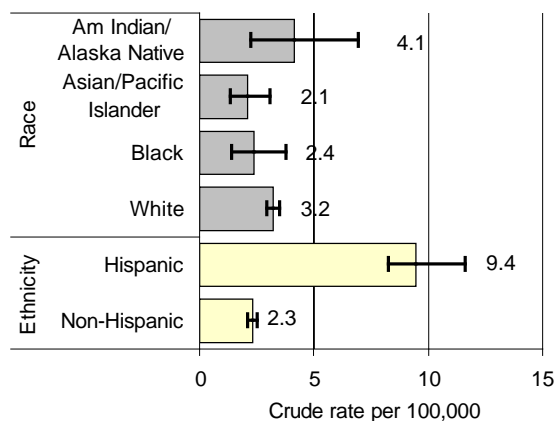
Hepatitis A is transmitted by the fecal-oral route. Nationally, people of lower socioeconomic status are at higher risk for hepatitis A, as are American Indians and Alaska Natives and people of Hispanic ethnicity, who may be disproportionately represented in relatively low socioeconomic groups. Patterns in Washington are similar to those seen nationally for Hispanics compared to non-Hispanics and for persons living in high-poverty areas and in areas where relatively few adults have completed college. Rates of hepatitis A have been decreasing since the mid-1990s for all race groups in Washington, a trend that is narrowing disparities. The decrease among American Indians and Alaska Natives has been especially pronounced. Behavioral risk factors for hepatitis A include poor sanitation associated with drug use, travel to areas with high rates of disease, and sexual contact with someone who has hepatitis A, particularly for men who have sex with men.

Rates

Race and Ethnicity

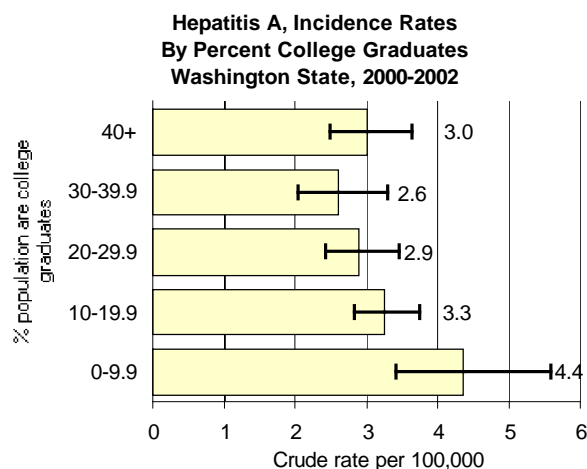
Race and ethnicity data are incomplete for many disease reports received in Washington, and as a result, interpretation of differences in disease rates between groups is difficult. In Washington during 2000 – 2002 combined, there were not significant differences in crude rates of hepatitis A among people in different race groups. The rate among Hispanics was about five times higher than that among non-Hispanics, reflecting national trends.¹ These differences are likely to reflect a disproportionate burden of poverty among Hispanics in Washington and the fact that they may more often travel to, or live with people who have traveled to, developing countries where hepatitis A is relatively common. (See Appendix A, Race and Hispanic Ethnicity.)

**Hepatitis A, Incidence Rates
By Race and Ethnicity
Washington State, 2000-2002**



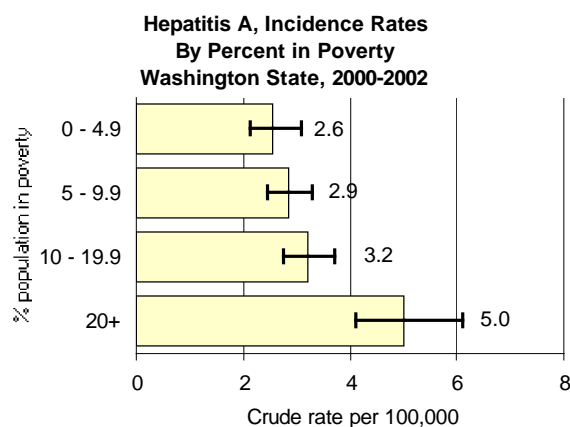
Education

To assess the association between education and hepatitis A, we assigned an education level to each person with hepatitis A based on the percent of people age 25 and older with a college degree in the census tract in which the person lived when reported. (See Appendix A, Education.) In Washington during 2000 – 2002 combined, persons living in census tracts where fewer than 10% of the population completed college were more likely to have hepatitis A compared to those living in census tracts where at least 20% of the population completed college.



Poverty

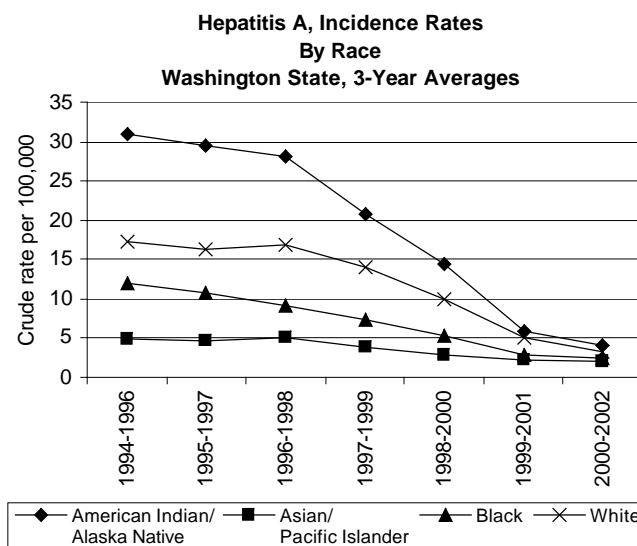
To study the link between poverty and hepatitis A, we measured poverty as the percent of the population living at or below the federal poverty level in the census tract in which the person lived when reported with hepatitis A. (See Appendix A, Poverty.) In Washington during 2000 – 2002 combined, the rate of reported hepatitis A increased as the proportion of the population living in poverty increased. The incidence of hepatitis A doubled from areas where the lowest proportion of the population lived in poverty to areas with the highest proportion in poverty. Poverty may be a marker for crowded living conditions, poor hygiene, and poor sanitation associated with drug use.



Trends

Hepatitis A rates in western states including Washington have typically been higher than rates in

other regions of the country. Since 1992, rates of hepatitis A have declined for race groups in Washington, and disparities have narrowed. This parallels national declines in the disease² and most likely reflects increases in routine childhood vaccination. Data for Hispanic ethnicity are too incomplete to assess trends for Hispanics in Washington, but national data show that hepatitis A is declining among Hispanics in the United States. (See Appendix A, Trend Analysis.)



Interventions

Vaccination against hepatitis A is likely to be a major contributor to the declining rates. The relatively large decline for some groups may also be related to an initiative in 2000 in which children in Washington counties with hepatitis A rates of more than 20 per 100,000 received free vaccinations. Free hepatitis A vaccinations will continue for children in high-risk counties even if the county rate drops to less than 20 per 10,000 and in any county for either children at high risk of exposure to hepatitis A or at parental request.

For More Information

Hepatitis A Chapter, *2002 Health of Washington State*, http://www.doh.wa.gov/HWS/doc/ID/ID_HEPA.doc.

Data Sources (For additional detail, see Appendix B.)

1994-2002 Annual Communicable Disease Reports. Washington State Department of Health.

Population data for race and ethnicity: National Center for Health Statistics bridged race population counts for 2000, 2001 and 2002;

Public Health – Seattle & King County intercensal interpolations for 1994 – 1999, EPE Unit, February 2003.

Population data for education and poverty: U.S. Census 2000 Summary File 3, Tables P37 and P87 available through American Fact Finder,
http://factfinder.census.gov/home/saff/main.html?_lang=en.
Downloaded December 2003.

References

¹ Centers for Disease Control and Prevention. Hepatitis Surveillance. Report Number 58, September 2003.

² Bell BP, Shapiro CN, Alter MJ, Moyer LA, Judson FN, et al. The Diverse Patterns of Hepatitis A Epidemiology in the United States. *JID* 1998;178:1579-1584

Hepatitis B

Definition: A viral infection of the liver manifested variously as an asymptomatic condition, severe jaundice, or fulminating fatal disease. In 6% - 10% of infected adults and 30% - 90% of infected young children, it results in a chronic carrier state with the potential for progression to cirrhosis or liver cancer. Infection is most frequently transmitted through sexual contact, injecting drug use, occupational exposures, household contact, or at birth, or rarely through transfusion of blood products. ICD-9 codes 070.2 and 070.3.

Summary

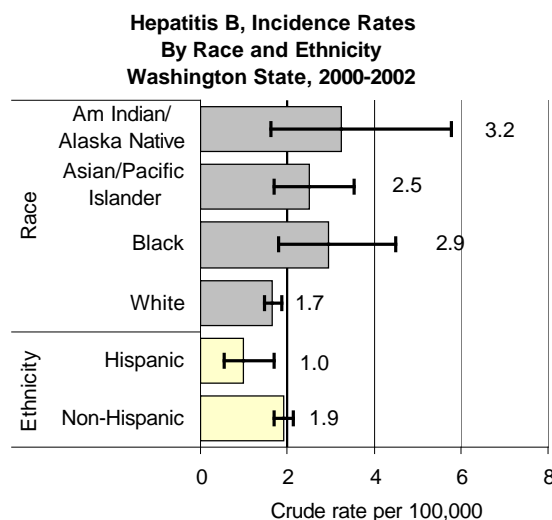
Hepatitis B is acquired through bloodborne and sexual transmission. Nationally and in Washington State, higher rates of hepatitis B are seen among people of lower socioeconomic status and among racial and ethnic groups that are disproportionately represented in lower socioeconomic levels. In Washington during 2000 – 2002 combined, rates of hepatitis B were highest among persons living in areas where fewer than 10% of the population completed college, and rates increased as the proportion of the population living in poverty increased. During 2000 – 2002 combined, rates of hepatitis B in Washington were higher for African Americans compared to whites. Since the mid-1990s, the disparities between whites and both African Americans and American Indians and Alaska Natives have decreased. Behavioral risk factors for hepatitis B include sharing intravenous drug equipment and sexual contact with someone who has acute or chronic hepatitis B.

Rates

Race and Ethnicity

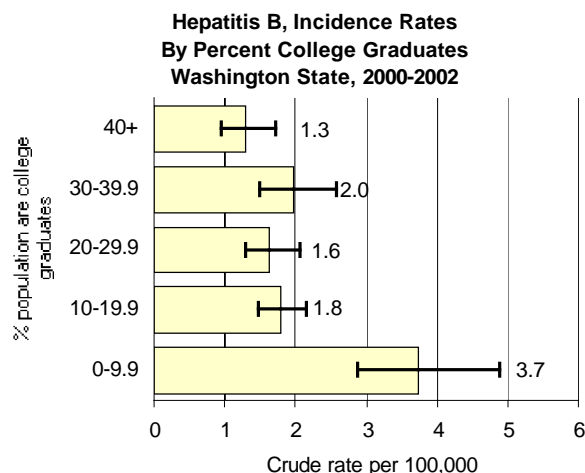
Race and ethnicity data are incomplete for many disease reports received in Washington, and as a result, interpretation of differences in disease rates between groups is difficult. In Washington, crude rates of hepatitis B are higher among African Americans compared to whites. American Indians and Alaska Natives and Asians and Pacific Islanders also seem to have higher rates of hepatitis B compared to whites, but these differences are not statistically significant. The rate among Hispanics is lower than that among non-Hispanics. National surveillance data show that rates of hepatitis B are highest among black non-Hispanics and Asians and Pacific Islanders.¹ These differences are unlikely to reflect genetic

factors, but they may be a reflection of socioeconomic and behavioral factors, as well as high rates of infection in Asia. (See Appendix A, Race and Hispanic Ethnicity.)



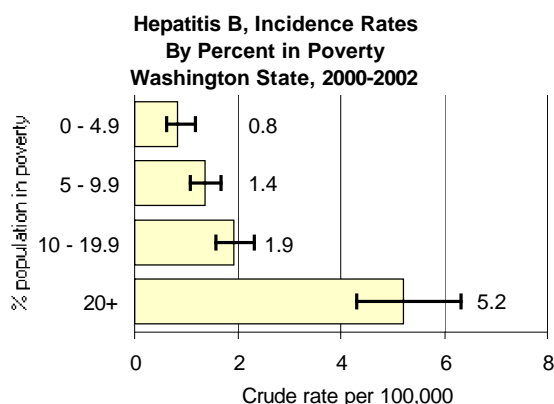
Education

To assess the association between education and hepatitis B, we assigned an educational level to each person with hepatitis B based on the percent of people age 25 and older with a college degree in the census tract in which the person lived when reported. (See Appendix A, Education.) In Washington from 2000 – 2002 combined, the rate of hepatitis B among persons residing in census tracts where less than 10% of the population completed college had higher rates of hepatitis B than people in census tracts where larger proportions of the population completed college.



Poverty

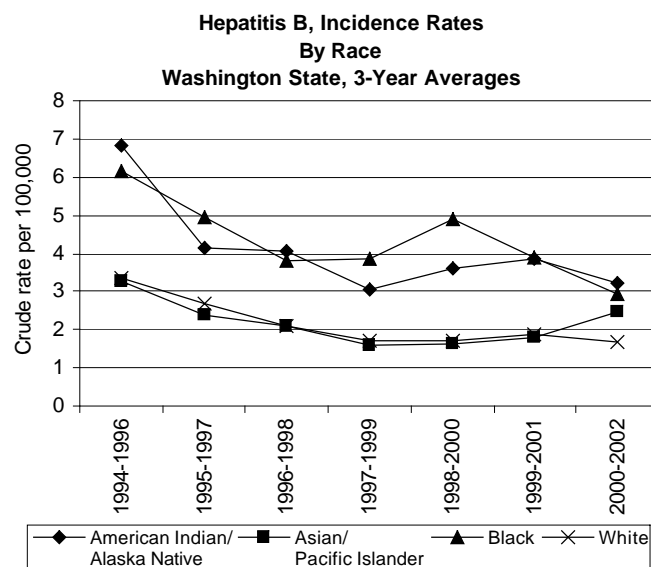
To study the link between poverty and hepatitis B, we measured poverty as the percent of the population living at or below the federal poverty level in the census tract in which the person lived when reported with hepatitis B. (See Appendix A, Poverty.) In Washington during 2000 – 2002 combined, the incidence rate of reported hepatitis B increased five-fold from the lowest to highest proportion of people living in poverty. Lower socioeconomic status may be associated with high risk drug-using behavior.



Trends

The declines in hepatitis B rates in Washington have been similar to those experienced in the rest of the country.² Since 1990, all race groups in Washington have shown declines in hepatitis B, although the decline for Asians and Pacific Islanders has leveled off since 1999. A contributing factor to the decline may be higher

rates of vaccination to prevent hepatitis B, including screening of pregnant women and inclusion of hepatitis B as a pediatric vaccination. Washington data were too incomplete to analyze rates by Hispanic ethnicity, but national data show rates declining among Hispanics in the nation as a whole. (See Appendix A, Trend Analysis.)



For More Information

Hepatitis B Chapter, 2002 *Health of Washington State*, http://www.doh.wa.gov/HWS/doc/ID/ID_HEPB.doc.

Data Sources (For additional detail, see Appendix B.)

1994-2002 Annual Communicable Disease Reports. Washington State Department of Health.

Population data for race and ethnicity: National Center for Health Statistics bridged race population counts for 2000, 2001 and 2002; Public Health – Seattle & King County intercensal interpolations for 1994 – 1999, EPE Unit, February 2003.

Population data for education and poverty: US Census 2000 Summary File 3, Tables P37 and P87 available through American Fact Finder, http://factfinder.census.gov/home/saff/main.html?_lang=en. Downloaded December 2003.

References

- 1 U.S. Centers for Disease Control and Prevention. Hepatitis Surveillance. Report Number 58, September 2003.
- 2 Goldstein ST, Alter MJ, Williams IT, Moyer LA, Judson FN, et al. Incidence and Risk Factors for Acute Hepatitis B in the United States, 1982-1998: Implications for Vaccination Programs. *JID* 2002;185:713-719.

Chronic Disease

Section Overview

This section addresses mortality and incidence for a set of important chronic diseases. Specifically, we examine mortality and incidence in relation to race, ethnic group, education, and poverty. Information on major risk factors for these diseases—including tobacco use, nutrition, physical activity, and obesity—can be found in the Major Risk and Protective Factors section of the *2002 Health of Washington State*.

This section includes four of the most common types of cancers (breast, lung, colorectal, and melanoma), in addition to invasive cervical cancer. Neither the *2002 Health of Washington State* nor the *2004 Supplement* includes a chapter on prostate cancer, because until recently, there had been no public health role for the prevention or treatment of this cancer. The role for public health in encouraging men to discuss options for screening with their doctors is emerging, and we expect to include prostate cancer in the next full update of the *Health of Washington State*.

In addition to cancer, we report on three of the ten top leading causes of death: coronary heart disease, stroke, and diabetes. We analyzed data for asthma, recognizing that it is one of the most common and costly diseases in the nation. However, the number of asthma deaths is relatively small, and we concluded that we did not have sufficient new information on asthma in Washington to warrant including asthma as a topic in this supplement. The asthma chapter in the *2002 Health of Washington State* includes some information on asthma in relation to race, ethnic group, income, and education.

Key Findings

In Washington State, we see racial, ethnic, and socioeconomic disparities for most of the chronic diseases included in this section. Generally, Asians and Pacific Islanders have the lowest death rates from chronic diseases and African Americans have the highest rates, but there are several exceptions. For example, Asians and Pacific Islanders have relatively high death rates from invasive cervical

cancer. In general, Hispanics have lower death rates from chronic diseases than non-Hispanics. However, Hispanics have higher rates than non-Hispanics for invasive cervical cancer and diabetes.

In general, rates of chronic disease were lower for people living in areas where a higher proportion of the population had a college degree and where a lower proportion of the population lived in poverty. Once again, there were a few exceptions, such as for new cases of melanoma and breast cancer.

We have attempted to provide some insight into the reasons for these racial, ethnic, and socioeconomic disparities. Briefly, differences in risky behaviors such as smoking, differences in preventive activities such as screening for cancer, and differences in access to and utilization of health care may provide partial explanations for the observed disparities. Further details are provided in specific chapters. More research is needed to provide explanations for these disparities so that targeted efforts can narrow the gaps among people of different races, ethnicities, and socioeconomic groups.

Interventions

Intervention strategies for prevention and treatment of chronic disease are discussed in several chapters for which there are specific interventions for people of different races and ethnicities or for people in different socioeconomic groups. Additional information on interventions is available in the corresponding chapters of the *2002 Health of Washington State*.

Coronary Heart Disease

Definition: Decreased flow of blood through the coronary arteries, usually caused by atherosclerosis. This results in a decreased oxygen supply to the heart muscle and can cause reduced function of the heart muscle and destruction of heart muscle cells (myocardial infarction or “heart attack.”) ICD-10 codes I20-I25.

Summary

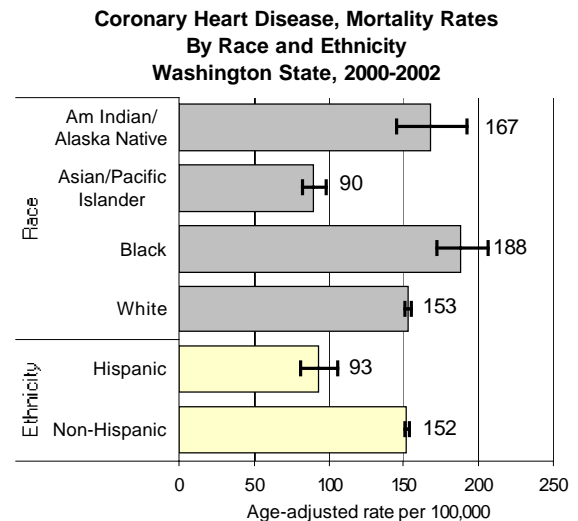
In Washington State during 2000 – 2002 combined, age-adjusted death rates from coronary heart disease were higher among African Americans and lower among Asians and Pacific Islanders compared to whites. Rates were also lower among Hispanics compared to non-Hispanics. Death rates in Washington increased as the proportion of the population that completed college decreased and as the proportion living in poverty increased. All of these findings are similar to those seen nationally. National studies suggest that an individual’s socioeconomic status—measured by occupation, education, and income level—explains a great deal of the racial disparity in coronary heart disease death.¹ In addition to individual factors, neighborhood characteristics also play a role. People living in lower socioeconomic areas are at increased risk, due in part to lack of neighborhood infrastructure that supports access to healthy foods, opportunities for physical activity, and availability of social, preventive, and emergency medical services.^{2, 3}

Rates

Race and Ethnicity

In Washington State, age-adjusted death rates from coronary heart disease for 2000 – 2002 combined were higher among African Americans and lower among Asians and Pacific Islanders compared to whites. Rates were also lower among Hispanics compared to non-Hispanics. The pattern for coronary heart disease deaths by race and ethnicity in Washington is similar to that in the nation as a whole.⁴ The death rate from heart disease for American Indians and Alaska Natives in Washington is much higher than for this group nationally. Death rates for other racial and ethnic groups are lower than the corresponding U.S.

rates. (See Appendix A, Race and Hispanic Ethnicity.)

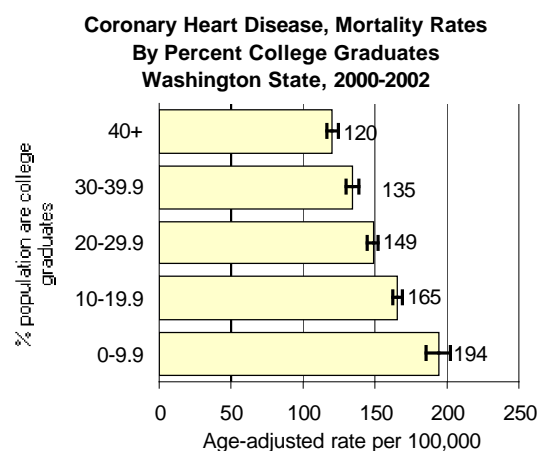


Education

To assess the association between coronary heart disease and education, we assigned an educational level to each person who died of coronary heart disease based on the percent of people age 25 and older with a college education in the census tract in which the decedent resided at death. (See Appendix A, Education.) In Washington for 2000 – 2002 combined, the age-adjusted death rate from coronary heart disease decreased as the percent of college graduates increased.

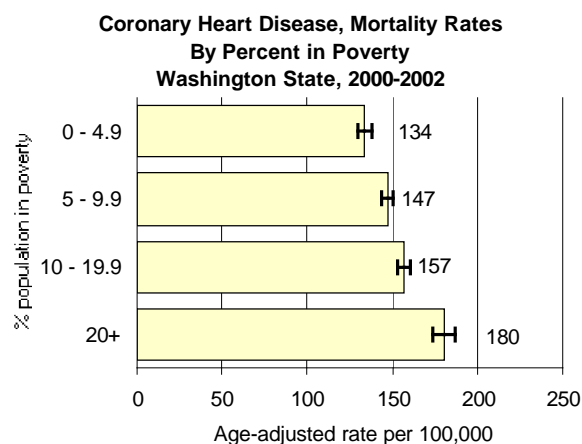
A number of studies have demonstrated that individuals with low educational attainment are more likely to report factors that put them at risk for heart disease, such as smoking, obesity, hypertension, and poor diet.⁵ Lower educational attainment is also associated with poor access to health care, poorer quality of medical treatment, and lower adherence to medical recommendations.⁶ Neighborhood characteristics also play a role. Neighborhoods in which persons have relatively low levels of formal education are unlikely to have the necessary tax base to support

community infrastructure, including stores that stock fresh produce and other heart-healthy foods and sites for exercise and recreation. This makes it difficult for individuals to practice behaviors necessary to achieve good cardiovascular health.⁷ A weak tax base may also limit the availability of preventive and emergency medical services.



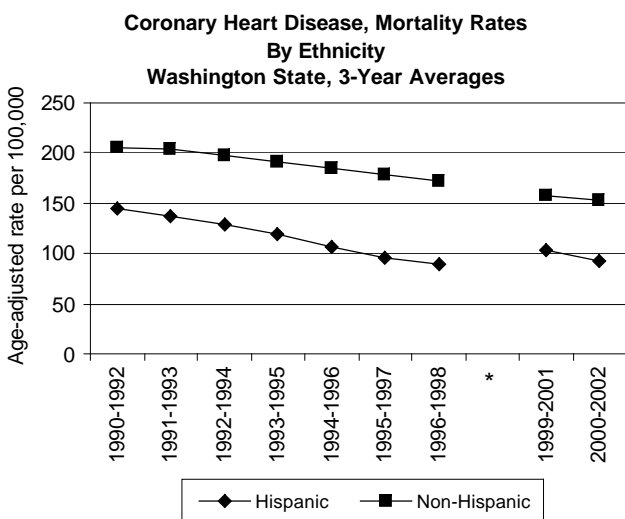
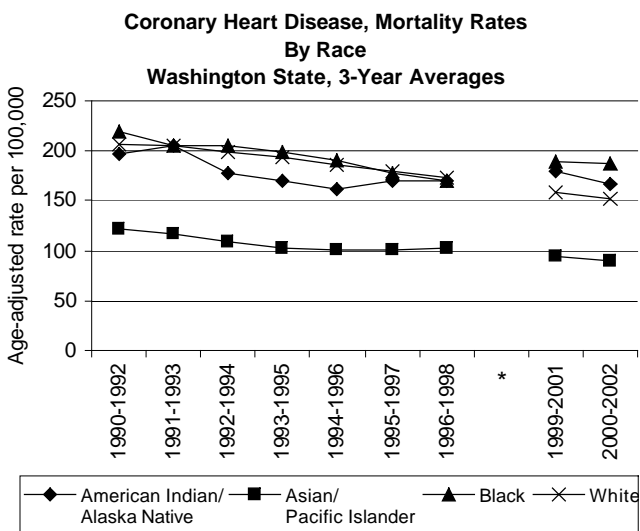
Poverty

To study the link between poverty and coronary heart disease, we measured poverty as the percent of the population that lived at or below the federal poverty level in the census tract in which the decedent resided at death. (See Appendix A, Poverty.) In Washington during 2000 – 2002 combined, the rate of coronary heart disease mortality increased as the percent of people living in poverty increased. These results are consistent with findings from national studies, which link increased cardiovascular mortality to lower income levels and poverty.^{8,9,10,11} Increased coronary heart disease mortality for those in poverty is associated with poor health behaviors,¹² increased exposure to occupational and environmental risk factors,¹³ and poor access to medical care.¹⁴ In addition, people living in neighborhoods with higher levels of poverty may lack social support and may experience increased levels of frustration and stress related to the social distribution of power and resources.¹⁵ As with education, high-poverty neighborhoods generally lack a tax base to support community infrastructure that encourages activities that prevent coronary heart disease.⁷



Trends

The rate of coronary heart disease mortality in the United States has declined dramatically since the mid-1960s. The rate continued to drop through the 1990s, though more slowly than previously.¹⁶ This decrease was observed nationally in all racial groups. Similarly, the rate of coronary heart disease deaths decreased in most racial and ethnic groups in Washington from 1990 to 2002. While Asians and Pacific Islanders had consistently lower coronary heart disease death rates than whites during this period, mortality for both groups decreased at a similar rate: 3% per year for whites and 2% per year for Asians and Pacific Islanders. Prior to 1994 – 1996, the coronary heart disease death rate for African Americans decreased more rapidly than that of whites, at a rate of nearly 5% per year, but the decrease has leveled off. Rates for Hispanics and non-Hispanics decreased about 5% and 3% each year during this period, respectively. (See Appendix A, Trend Analysis.)



Interventions

The Guide to Community Preventive Services¹⁷ recommends several evidence-based interventions within the health care system to eliminate health disparities, including programs to recruit and retain staff who reflect the cultural diversity of their communities, use of interpreter services or bilingual providers, provision of cultural competency training for health care providers, use of linguistically and culturally appropriate health education materials, and support for culturally specific health care settings. These strategies to eliminate differences in the quality of medical care

for persons in a diversity of racial and ethnic groups can be combined with other efforts to improve the quality of health care overall as well as with interventions that address individual and community-level prevention strategies, some of which are discussed in the Coronary Heart Disease chapter in the *2002 Health of Washington State*.

For More Information

Coronary Heart Disease Chapter, *2002 Health of Washington State*, http://www.doh.wa.gov/HWS/doc/CD/CD_HRT.doc.

Department of Health Heart Disease and Stroke Prevention Program. Telephone: (360) 236-3792

Data Sources (For additional detail, see Appendix B.)

State death data: Vital Registration System Annual Statistical Files, Washington State Deaths 1980-2002 CD-ROM issued November 2003.

Population data for race and ethnicity: U.S. Census for 1990; National Center for Health Statistics bridged race population counts for 2000, 2001 and 2002; Public Health – Seattle & King County intercensal interpolations for 1991 – 1999, EPE Unit, February 2003.

Population data for education and poverty: U.S. Census 2000 Summary File 3, Tables P37 and P87 available through American Fact Finder, http://factfinder.census.gov/home/saff/main.html?_lang=en. Downloaded December 2003.

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¹¹ Davey Smith G., et. al. Socioeconomic differentials in mortality risk among men screened for the Multiple Risk Factor Intervention Trial: I White Men. *Am J Public Health*. 1996;86:486-96

¹² Liu, K., et. al. Relationship of education to major risk factors and death from coronary heart disease, cardiovascular diseases and all causes. *Circulation*. 1982; 66:1308-1314.

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¹⁶ Cooper, R, et. al. Trends in disparities in coronary heart disease, stroke and other cardiovascular diseases in the United States. *Circulation*, 2000;102(25):3137-3147.

¹⁷ <http://www.thecommunityguide.org>

Stroke

Definition: Loss of muscle function, vision, sensation, or speech, resulting from brain cell death. Ischemic stroke, caused by a severe reduction in blood supply to part of the brain, accounts for about 80% of all strokes. Reduction in blood flow may be caused by blockage of an artery by atherosclerosis or by emboli (debris) transported through the bloodstream. Hemorrhagic stroke is the result of bleeding blood vessels in the brain. ICD-9 codes 430-438, ICD-10 codes I60-I69.

Summary

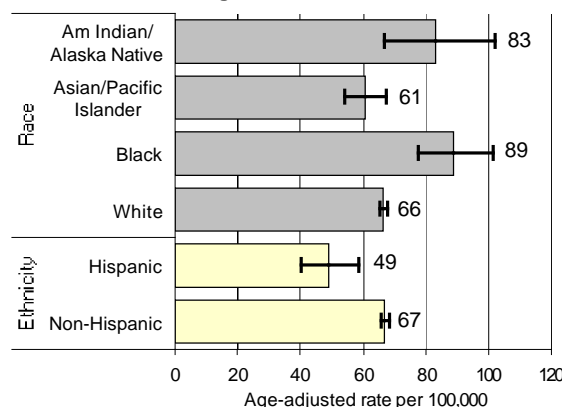
In Washington State during 2000 – 2002 combined, age-adjusted death rates from stroke were higher among African Americans and American Indians and Alaska Natives compared to whites and Asians and Pacific Islanders. Rates are lower among Hispanics compared to non-Hispanics. Stroke death rates in Washington increased as the proportion of the population that completed college decreased. The variation in stroke mortality in Washington by race is similar to that seen nationally.¹ National studies suggest that some of the racial disparities in stroke death may be explained by differences in occupation, education, and income.^{2,3} In addition to individual factors, neighborhood characteristics also play a role. Disparities in mortality may exist because of inequalities in the distribution of health care resources in a community, or because of the increased stress, violence, and social isolation present in many lower socioeconomic areas.⁴

Rates

Race and Ethnicity

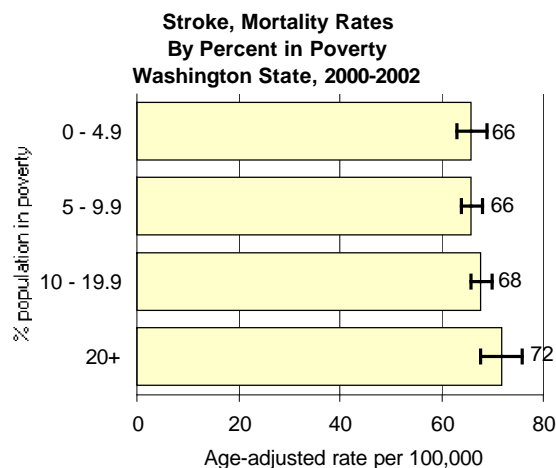
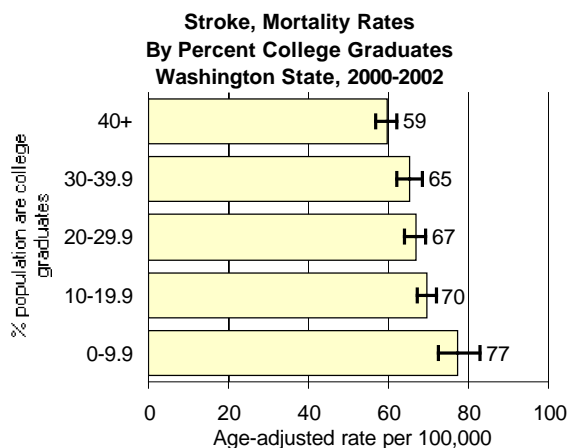
In Washington State, age-adjusted death rates from stroke for 2000 – 2002 combined are higher among African Americans and American Indians and Alaska Natives compared to whites and Asians and Pacific Islanders. Stroke death rates are lower among Hispanics compared to non-Hispanics. For all racial categories, Washington's death rates are higher than those of the nation as a whole.⁵ The national stroke death rate for American Indians and Alaska Natives is lower than that of other racial groups. In Washington, however, it is similar to the African American stroke death rate. (See Appendix A, Race and Hispanic Ethnicity.)

**Stroke, Mortality Rates
By Race and Ethnicity
Washington State, 2000-2002**



Education

To assess the association between stroke and education, we assigned an educational level to each person who died of stroke based on the percent of people age 25 and older with a college education in the census tract in which the decedent resided at death. (See Appendix A, Education.) In Washington for 2000 – 2002 combined, the age-adjusted stroke death rate decreased as the percent of college graduates increased. Disparities in education may create differences in access to the social power, prestige, and knowledge necessary to maintain a healthy lifestyle, access preventive services, or successfully recover from a stroke.⁶ For example, lower educational attainment could cause miscommunication between physician and patient, leading to poor compliance with anti-hypertensive medication, thereby increasing stroke risk.



Poverty

To study the link between poverty and stroke, we measured poverty as the percent of the population that lived at or below the federal poverty level in the census tract in which the decedent resided at death. (See Appendix A, Poverty.) For 2000 – 2002 combined, we did not find significant variations in Washington stroke deaths by neighborhood poverty level. This differs from several studies conducted in industrialized nations that have demonstrated disparities in stroke mortality by income and neighborhood-level poverty.^{7 8} This is partly due to a more unfavorable risk factor profile (such as higher blood pressure and more smoking) among people living in high-poverty areas.⁹ In addition, living in high-poverty areas is often associated with increased stress, greater distance to health facilities, under-diagnosis of severe cardiovascular disease, and poor access to health services.¹⁰ Lower personal income has been associated with worse long term survival after stroke. For example, a recent Canadian study showed that despite universal access to the Canadian health system, patients with the lowest incomes had higher stroke mortality and poorer access to post-stroke medical treatments compared to patients with the highest incomes.¹¹ The reasons why this pattern is not observed in Washington bears further investigation.

Trends

National trend data show that that stroke death rates declined only slightly over the past decade. In Washington, no racial or ethnic group showed any significant change in the rate of stroke deaths from 1990 to 2002. Throughout this period, African Americans and American Indians and Alaska Natives had higher rates of stroke deaths than whites, while Asians and Pacific Islanders generally had lower rates of stroke deaths. (See Appendix A, Trend Analysis.)

For More Information

Stroke Chapter, *2002 Health of Washington State*, http://www.doh.wa.gov/HWS/doc/CD/CD_STR.doc.

Department of Health Heart Disease and Stroke Prevention Program. Telephone: (360) 236-3792

Data Sources (For additional detail, see Appendix B.)

State death data: Vital Registration System Annual Statistical Files, Washington State Deaths 1980-2002 CD-ROM issued November 2003.

Population data for race and ethnicity: U.S. Census for 1990; National Center for Health Statistics bridged race population counts for 2000, 2001 and 2002; Public Health – Seattle & King County intercensal interpolations for 1991 – 1999, EPE Unit, February 2003.

Population data for education and poverty: U.S. Census 2000 Summary File 3, Tables P37 and P87 available through American Fact Finder, http://factfinder.census.gov/home/saff/main.html?_lang=en. Downloaded December 2003.

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Female Breast Cancer

Definition: Cancer of the female breast is characterized by uncontrolled growth of neoplastic cells developing in a woman's breast, with the potential to invade and spread to other sites. Female breast cancer is coded as ICD-9 code 174 and ICD-10 code C50 on the death certificate.

Summary

In Washington State, age-adjusted death rates from female breast cancer during 2000 – 2002 combined were higher among African Americans and lower among Asians and Pacific Islanders compared to whites. Rates were also lower for Hispanics compared to non-Hispanics. Both in Washington and nationally, the disparity between death rates for whites and African Americans is widening, since death rates for breast cancer are decreasing for whites but not for African American women. Recent research suggests that even after accounting for poverty and education, African American women are more likely to be diagnosed when breast cancer is more advanced and difficult to treat compared to whites.¹ The reasons for disparities in severity of disease at diagnosis and in mortality are complex. Recent research focuses on availability and utilization of mammography among African Americans, including economic and cultural barriers, and biological factors.^{2,3}

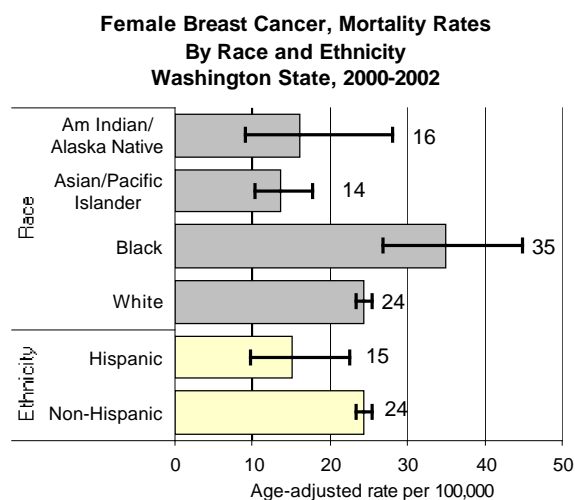
Rates

Race and Ethnicity

Both Washington State data for 2000 – 2002 combined and recent national data show that age-adjusted death rates from female breast cancer are higher among African Americans and lower among Asians and Pacific Islanders compared to whites. Rates were also lower for Hispanics compared to non-Hispanics. (See Appendix A, Race and Hispanic Ethnicity.) Recent research suggests that socioeconomic factors and access to health care do not completely account for the significant differences between whites and African Americans with respect to how far the cancer has spread before it is diagnosed and mortality.^{1,2,3,4,5,6,7} Even after accounting for poverty level and education, African American

women are more likely to be diagnosed when breast cancer is more advanced and difficult to treat compared to whites.¹ The reasons for disparities in severity of disease at diagnosis and in mortality are complex. Recent research focuses on availability and utilization of mammography among African Americans, including economic and cultural barriers, and biological factors.^{2,3}

Asian and Pacific Islander data should be interpreted with caution, because the data include an aggregation of subgroups that may obscure actual differences. For example, data from Hawaii show that Hawaiian women and women of Filipino ancestry are more likely to be diagnosed later in the disease process and have poorer survival rates compared with non-Hispanic whites.^{8,9} Other evidence indicates that foreign born Asian and Pacific Islander women are also more likely to be diagnosed later in the disease process compared to U.S.-born Asian and Pacific Islander women.¹⁰ Reliable data at the subgroup level for Asians and Pacific Islanders are not available for Washington State cancer statistics.



Education

To assess the association between breast cancer and education, we assigned an educational level to each woman who died from breast cancer based on the percent of people age 25 and older with a college education in the census tract in which the decedent resided at death. (See Appendix A, Education.) In Washington for 2000 – 2002 combined, there were no differences in breast cancer death rates based on the proportion of the population who completed college. These data may be somewhat misleading, however, because women with lower levels of education are less likely to be diagnosed with breast cancer than more educated women. (See Other Measures of Impact and Burden.) There is evidence that once a woman is diagnosed, she is more likely to die from breast cancer if she lives in an area where the overall education level is relatively low.¹¹

Poverty

To study the link between breast cancer and poverty, we measured poverty as the percent of the population who were at or below the federal poverty level in the census tract in which the woman resided when she died. (See Appendix A, Poverty.) In Washington for 2000 – 2002 combined, there were no differences in breast cancer death rates based on the percent of the population living in poverty. National data from the National Center for Health Statistics also show no significant differences in breast cancer death rates among areas with different proportions of the population living in poverty. But these data may be somewhat misleading, because poorer women are less likely to be diagnosed with breast cancer than wealthier women. (See Other Measures of Impact and Burden.) There is evidence that once a woman is diagnosed, she is more likely to die from breast cancer if she lives in a high-poverty area than if she lives in a low-poverty area.¹¹

Trends

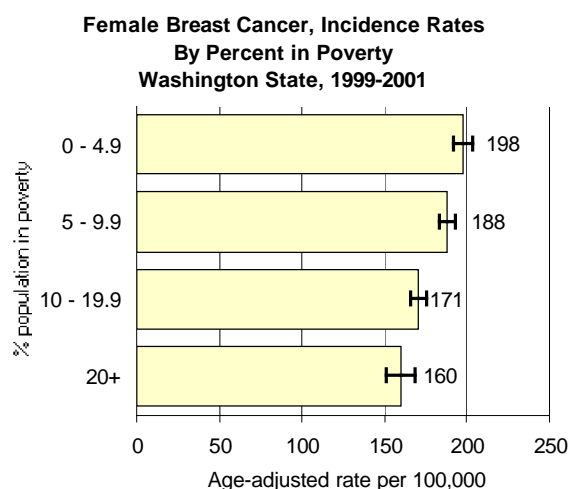
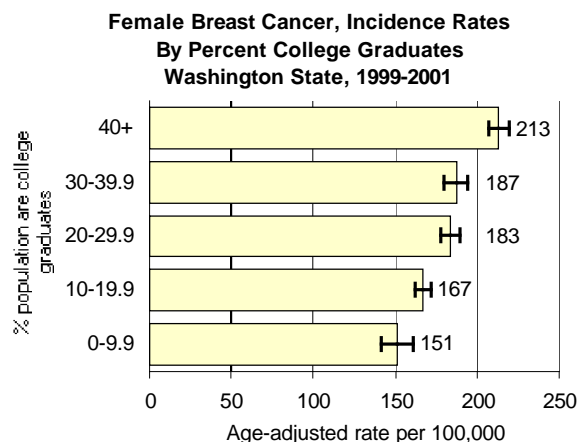
U.S. data indicate that while breast cancer death rates have been declining for white women since 1989, African American women have not experienced a similar decline. Therefore, the racial gap in breast cancer mortality is widening. This is also the trend in Washington. State data show that breast cancer mortality rates for white women

decreased about 3% each year from 1990 to 2002, while for women of other races, rates remained constant. Similarly, rates for Hispanics have not changed since 1990. (See Appendix A, Trend Analysis.)

Other Measures of Impact and Burden

Although mortality from breast cancer is highest among African American women in Washington, the age-adjusted rate at which new breast cancers are diagnosed (incidence rate) is highest among white women. This pattern is the same as that seen nationally. As with mortality, Hispanic women have lower rates of new breast cancers compared to non-Hispanics. Washington has relatively high rates of new breast cancer compared to national rates. But in 2001, the most recent year of available data, the incidence rates for African American and Asian and Pacific Islander women in Washington were lower than the national rates for those groups. The reasons for Washington's overall higher incidence rates and relatively lower rates for African American and Asian and Pacific Islander women have not been delineated. Age-adjusted incidence rates for breast cancer in Washington have been increasing since 1990 for white, Asian and Pacific Islander, and non-Hispanic women.

In contrast to mortality rates, incidence rates for breast cancer in Washington for 1999 – 2001 combined were higher in areas where a larger proportion of the population has completed college and where few people live in poverty. Reasons for this phenomenon are not completely understood, but it is partially attributed to later childbearing and higher rates of regular mammography screening among more educated and wealthier women.¹¹



Intervention Strategies

Women who are diagnosed with breast cancer when the disease is more advanced experience poorer survival than women diagnosed with less advanced disease. It is likely that screening, while important for all women, is particularly critical for African American women. Fortunately, racial and ethnic differences in mammography screening rates are lessening over time. Disparities among women in lower socioeconomic groups and with less access to medical care remain.^{12,13} In addition to access and treatment issues, researchers are currently investigating what role cultural and biological factors may play in differences in screening behaviors and disease outcomes.

For More Information

Female Breast Cancer Chapter, *2002 Health of Washington State*, http://www.doh.wa.gov/HWS/doc/CD/CD_BCN.doc.

Data Sources (For additional detail, see Appendix B.)

State death data: Vital Registration System Annual Statistical Files, Washington State Deaths 1980-2002 CD-ROM issued November 2003.

Cancer incidence data: Washington State Cancer Registry, 2003 Release.

Population data for race and ethnicity: U.S. Census for 1990; National Center for Health Statistics bridged race population counts for 2000, 2001 and 2002; Public Health – Seattle & King County intercensal interpolations for 1991 – 1999, EPE Unit, February 2003.

Population data for education and poverty: U.S. Census 2000 Summary File 3, Tables P37 and P87 available through American Fact Finder,

http://factfinder.census.gov/home/saff/main.html?_lang=en. Downloaded December 2003.

Technical Notes

Cancer incidence: We have used ICD-O-2 codes C50.0 – C50.9 excluding morphologies 9590 – 9970. This definition includes ductal and lobular carcinoma in situ. When we compare Washington and national incidence, we include the in situ cases for both Washington and the nation. But many national reports, such as those commonly published by the American Cancer Society and the National Cancer Institute, do not include in situ cases. Incidence rates are lower when in situ cases are not included.

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Invasive Cervical Cancer

Summary

In Washington State, age-adjusted incidence rates for invasive cervical cancer for 1999 – 2001 combined were higher among Asians and Pacific Islanders and Hispanics compared to whites and non-Hispanics, respectively. Incidence rates were higher among Washington women living in census tracts where lower proportions of the population completed college compared to women in census tracts where higher proportions completed college. Incidence rates were also higher among women in areas with higher proportions of people living in poverty. All of these findings are similar to those seen nationally. Poorer women, women with lower levels of education, and women who do not have health insurance are more likely than other women to be diagnosed when the cancer has advanced beyond the earliest stage.¹ This may account for much of the disparity in incidence and mortality from invasive cervical cancer.

Rates

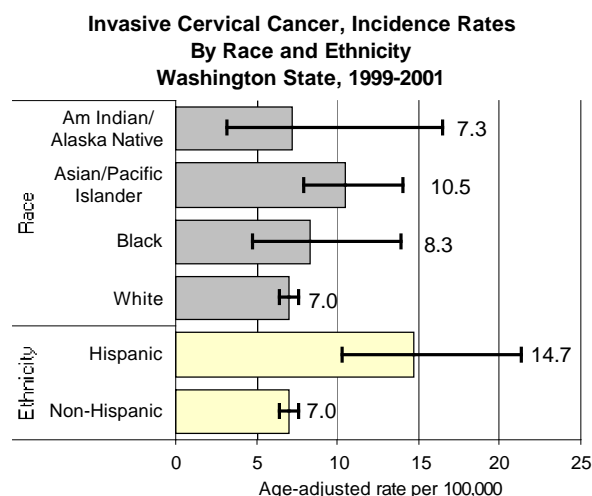
Race and Ethnicity

In Washington State for 1999 – 2001 combined, age-adjusted incidence rates from invasive cervical cancer were higher among Asians and Pacific Islanders compared to whites. Age-adjusted incidence rates were also higher among Hispanics compared to non-Hispanics. National data indicate that African American women also have higher rates of invasive cervical cancer than whites,² but this pattern was not seen in Washington.

The rates for Asian and Pacific Islander women should be interpreted with caution, because the Asian and Pacific Islander category includes an aggregation of different subgroups, many of which have rates that are different from the overall rate.

Definition: Invasive cervical cancer of the uterine cervix is characterized by uncontrolled growth of cancer cells developing in the cervix of the uterus, which invade and may spread to other sites. The Washington State Cancer registry does not collect information on precancerous or *in situ* cervical cancer. Invasive cervical cancer is coded using ICD-O-2 codes C53.0–C53.9 with behavior code 3 (malignant) and excluding morphology 9590-9970.

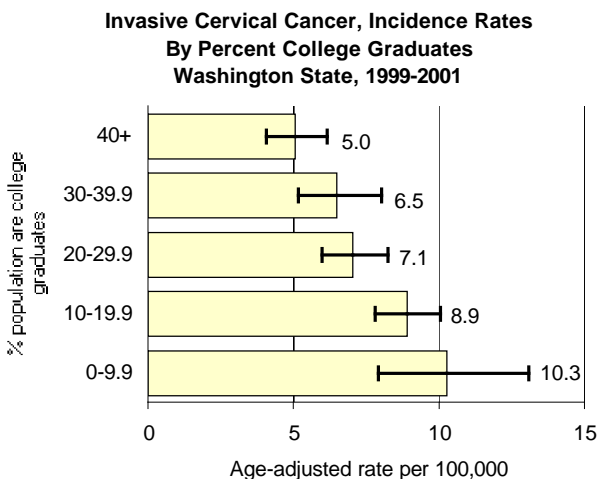
For example, the U.S. invasive cervical cancer incidence rate is four times higher among Vietnamese women compared to all Asian and Pacific Islander populations combined.³ Reliable data at the subgroup level for Asians and Pacific Islanders are not available for Washington State cancer statistics. (See Appendix A, Race and Hispanic Ethnicity.)



Education

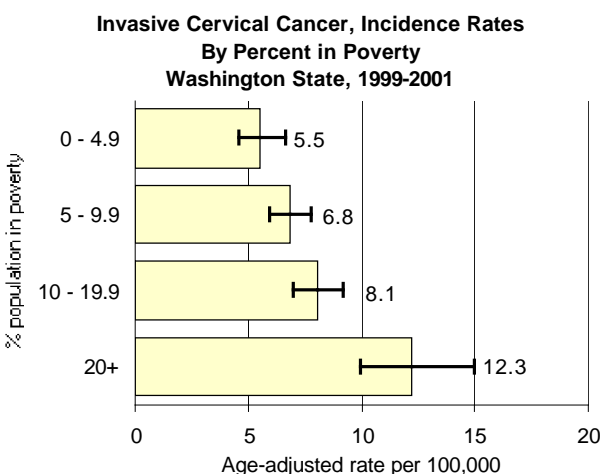
To assess the association between education and cervical cancer incidence, we assigned an educational level to each woman who was diagnosed with invasive cervical cancer based on the percent of people age 25 and older with a college education in the census tract in which the woman resided at the time of diagnosis. (See Appendix A, Education.) During 1999 – 2001, Washington women living in census tracts where relatively more people completed college had lower incidence rates of invasive cervical cancer than women living in census tracts where fewer people completed college. This is consistent with findings that women with higher levels of education are more likely to have had Pap tests, the primary screening test for detecting cervical

abnormalities before they develop into invasive cancer.



Poverty

To study the link between poverty and cervical cancer incidence, we measured poverty as the percent of the population who were at or below the federal poverty level in the census tract in which the woman resided at the time of diagnosis. (See Appendix A, Poverty.) For 1999 – 2001 combined, Washington women who lived in census tracts where more people lived in poverty had higher incidence rates for invasive cervical cancer than women in census tracts where fewer people lived in poverty. National cervical cancer incidence data also show a significant relationship between poverty and cervical cancer with women in high poverty counties having an incidence rate that is at least a third higher than those in low poverty counties.⁴



Trends

Washington data show a decline in invasive cervical cancer incidence of about 3% each year for whites and non-Hispanics during 1992 – 2001. Rates of invasive cervical cancer incidence for other groups vary substantially year to year, most likely due to the relatively small number of women with cervical cancer in those groups. This variability makes it difficult to assess trends over time. (See Appendix A, Trend Analysis.)

Other Measures of Impact and Burden

Fortunately, death from cervical cancer is relatively rare, making it difficult to compare cervical cancer mortality among different population groups. But Washington data for 2000 – 2002 combined do indicate that Asian and Pacific Islander women have higher rates of death from cervical cancer than whites. Additionally, women living in areas where less than 10% of the population has completed college have higher rates of death from cervical cancer compared to women living in areas where at least 30% of the population has completed college.

In Washington, rates of death from cervical cancer are the same for women living in high and low poverty areas. This is not consistent with national data, perhaps due to the small number of deaths from cervical cancer in Washington. Nationally, cervical cancer mortality rates decreased consistently for women in both high and low poverty areas during 1975 – 1999, but in the 1990s, women residing in high poverty U.S. counties experienced at least 70% higher cervical cancer mortality than women in low poverty counties. Additionally, cervical cancer mortality rose with increasing poverty in all race and ethnic groups.⁴ While cervical cancer death rates decreased during 1985 – 1996 for U.S.-born women, rates have increased among foreign-born women living in the United States.⁵

Intervention Strategies

The risk factor most strongly associated with death from invasive cervical cancer is the failure to receive regular Pap screening. The disease can be prevented, in most cases, through regular screening. In addition, diagnosed abnormalities

must be followed up with appropriate and timely treatment. Populations with the highest incidence and mortality rates, including Asian and Pacific Islander and Hispanic women and women living at or near the poverty level, are the focus of research on outreach efforts that are culturally sensitive.

For More Information

Invasive Cervical Cancer Chapter, 2002 Health of Washington State,
http://www.doh.wa.gov/HWS/doc/CD/CD_CVCN.doc.

Data Sources (For additional detail, see Appendix B.)

State death data: Vital Registration System Annual Statistical Files, Washington State Deaths 1980-2002 CD-ROM issued November 2003.

Cancer incidence data: Washington State Cancer Registry, 2003 Release.

Population data for race and ethnicity: U.S. Census for 1990; National Center for Health Statistics bridged race population counts for 2000, 2001 and 2002; Public Health – Seattle & King County intercensal interpolations for 1991 – 1999, EPE Unit, February 2003.

Population data for education and poverty: U.S. Census 2000 Summary File 3, Tables P37 and P87 available through American Fact Finder,
http://factfinder.census.gov/home/saff/main.html?_lang=en.
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² Ries LAG, Eisner MP, Kosary CL, Hankey BF, Miller BA, Clegg L, Mariotto A, Fay MP, Feuer EJ, Edwards BK (eds.). *Seer cancer statistics review, 1975-2000*, National Cancer Institute, Bethesda, Maryland.

³ National Cancer Institute. Cancer health disparities [4/23/03]. Available from: <http://www.cancer.gov/newscenter/healthdisparities>

⁴ Area socioeconomic variations in U.S. cancer incidence, mortality, stage, treatment, and survival, 1975-1999 (NCI 2003). Available from: <http://seer.cancer.gov/>

⁵ Seeff LC, McKenna MT. Cervical cancer mortality among foreign-born women living in the United States, 1985-1996. *Cancer Detection and Prevention*. 2003;27:203-208.

Colorectal Cancer

Summary

In Washington State during 1999 – 2001, the age-adjusted incidence rates for colorectal cancer were higher for whites and African Americans than for Asians and Pacific Islanders. Disparities in death rates from colorectal cancer seem to be increasing. Death rates for whites and Asians and Pacific Islanders have been decreasing while rates for African Americans and American Indians and Alaska Natives have stayed constant.

People living in areas where less than 20% of the population completed college were more likely to develop colorectal cancer compared to those in areas where a larger percent completed college. People in areas where 5% or more of the population lived in poverty had higher incidence rates than people living in areas with less poverty. In contrast, mortality rates for colorectal cancer in Washington did not differ by poverty or education.

Because screening can both prevent and detect colorectal cancer in an early, more treatable stage, differences in availability and utilization of screening may play a role in the socioeconomic and race disparities. The lack of differences in mortality rates by poverty and education may reflect different patterns for incidence and death or the inability of a community measure to detect small differences in death rates related to economic resources and education.

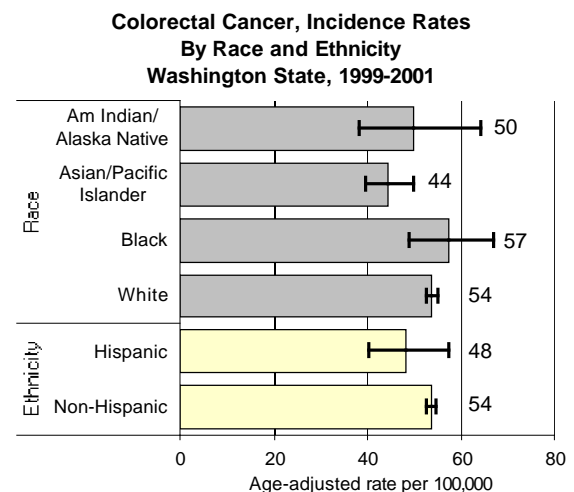
Rates

Race and Ethnicity

In Washington State for 1999 – 2001 combined, African Americans and whites had higher age-adjusted incidence rates for colorectal cancer than Asians and Pacific Islanders. This observation conforms to the national pattern. Nationally, African Americans also have higher rates than

Definition: Colorectal cancer, or cancer of the colon or rectum, is characterized by uncontrolled growth of neoplastic cells developing in the lower segment of the digestive tract, with the potential to invade and spread to other sites. In the Washington State Cancer Registry, new cases of colorectal cancer are coded to ICD-O-2 codes C18.0-C18.9, C19.9, C20.9, C26.0, excluding morphology 9590-9970.

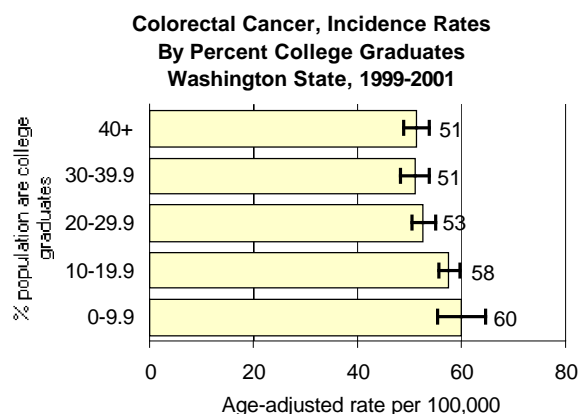
whites.¹ This pattern seems similar in Washington, but differences between rates for African Americans and whites are hard to assess given the relatively small number of African Americans diagnosed with colorectal cancer in Washington. National data show that Hispanics have significantly lower age-adjusted incidence rates compared to non-Hispanic whites.² As with African Americans, the relatively small number of Hispanics diagnosed with colorectal cancer makes it difficult to compare Hispanics and non-Hispanics in Washington. (See Appendix A, Race and Hispanic Ethnicity.)



Education

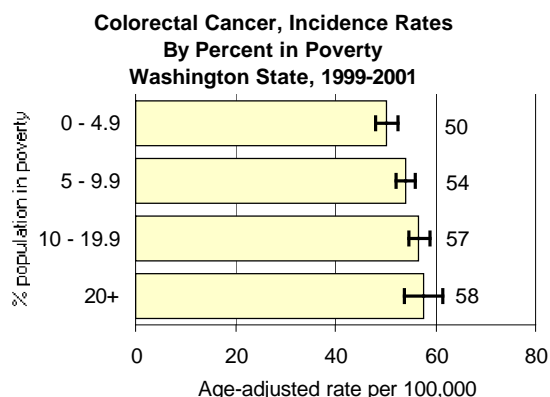
To assess the association between education and colorectal cancer incidence, we assigned an educational level to each person with colorectal cancer based on the percent of people age 25 and older with a college education in the census tract in which the individual lived at time of diagnosis. (See Appendix A, Education.) The age-adjusted incidence rates for colorectal cancer increased with a decreasing percent of college graduates in the census tract. Furthermore, those who lived in tracts where less than 20% of the population had a college degree were more likely to develop colorectal cancer compared to those who lived in

tracts where a greater proportion of the population had a college degree. This finding is consistent with the finding that in Washington from 1997 – 1999, people with higher levels of education were more likely to be screened for colorectal cancer than those with relatively lower levels.³ Colorectal cancer screening can detect pre-cancerous polyps, the removal of which can prevent cancer and hence lower the incidence rate.



Poverty

To study the link between poverty and colorectal cancer incidence, we measured poverty as the percent of the population living at or below the federal poverty level in the census tract in which the individual lived at the time of diagnosis. (See Appendix A, Poverty.) The age-adjusted incidence rates for colorectal cancer increased as the percent of the population living in poverty increased. Furthermore, people in census tracts where 5% or more of the population lived in poverty had higher incidence rates of colorectal cancer compared to people living in census tracts where a lower proportion of the population lived in poverty.



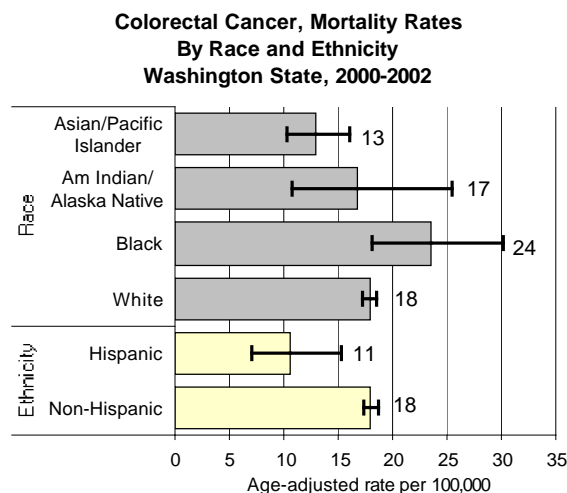
Trends

Since 1992, age-adjusted incidence rates for colorectal cancer have been declining for African Americans by about 2% each year. No significant changes occurred for other races or ethnicities. (See Appendix A, Trend Analysis.)

Other Measures of Impact and Burden

In Washington State, data from 2000 – 2002 combined showed African Americans having the highest and whites the second highest age-adjusted death rates for colorectal cancer. Rates for both African Americans and whites are significantly higher than rates for Asians and Pacific Islanders. The relatively high rates for African Americans and low rates for Asians and Pacific Islanders are similar to the national pattern.^{1,2} While non-Hispanics had a significantly higher death rate compared to Hispanics, which also mirrors the national pattern, this may reflect underreporting of Hispanic ethnicity on death certificates. (See Appendix B, Death Certificate System, Caveats.)

Recent research indicated that African Americans, due to a lower rate of screening, were more likely to be diagnosed when colorectal was more advanced compared to whites.⁴ Another study showed that African Americans were less likely to receive high quality treatment for colorectal cancer compared to whites.⁵ Both of these factors are likely to play a role in the relatively high death rates from colorectal cancer among African Americans.



Disparities may be increasing. Since 1990, age-adjusted mortality rates for colorectal cancer have been declining about 2% for whites and about 3% for Asians and Pacific Islanders each year. Rates for African Americans and American Indians and Alaska Natives have remained constant. Death rates for Hispanics have been decreasing by about 2% annually since 1990, while rates for non-Hispanics started decreasing by 3% annually beginning in 1994.

Washington data for 2000 – 2002 combined did not show much variation in age-adjusted death rates from colorectal cancer by percent of the population living in poverty or the proportion with a college degree. This is somewhat inconsistent with the findings for incidence rates and screening discussed above. This inconsistency may reflect differential patterns for incidence and death or an inability to use a community measure to detect small differences in death rates related to economic resources and education. Although not apparent in Washington data, economic deprivation may play an important role preventing a person's participation in screening, leading to later cancer detection and poorer survival.⁶ In addition to early detection, early definitive treatment is important for survival.⁷ It has been shown that the main causes of treatment delay by providers were insufficient clinical investigation and a lack of awareness when typical first symptoms of colorectal cancer were present.⁸

Interventions

It is likely that provision of screening and high quality treatment—irrespective of race, ethnicity, education, or economic factors—would reduce the existing disparities in incidence and mortality for colorectal cancer.^{5,6,7} Provider education regarding early signs of colorectal cancer and elements needed for a thorough clinical investigation might also help reduce disparities.⁷

For More Information

Colorectal Cancer Chapter, 2002 *Health of Washington State*, http://www.doh.wa.gov/HWS/doc/CD_CCN.doc

Data Sources (For additional detail, see Appendix B.)

State death data: Vital Registration System Annual Statistical Files, Washington State Deaths 1980-2002 CD-ROM issued November 2003.

Cancer incidence data: Washington State Cancer Registry, 2003 Release.

Population data for race and ethnicity: U.S. Census for 1990; National Center for Health Statistics bridged race population counts for 2000, 2001 and 2002; Public Health – Seattle & King County intercensal interpolations for 1991 – 1999, EPE Unit, February 2003.

Population data for education and poverty: US Census 2000 Summary File 3, Tables P37 and P87 available through American Fact Finder, http://factfinder.census.gov/home/saff/main.html?_lang=en. Downloaded December 2003.

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- ¹ U.S. Cancer Statistics Working Group. United States Cancer Statistics: 2000 Incidence. Atlanta (GA): Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; 2003.
- ² North American Association of Central Cancer Registries. Cancer Incidence in U.S. Hispanics/Latinos, 1995-2000. Springfield, IL, 2003 December.
- ³ Washington State Department of Health. *Health of Washington State*. Colorectal Cancer. Olympia, WA, 2002 Aug [cited 2004, April 7th] 418p. Available from <http://www.doh.wa.gov/HWS>.
- ⁴ Cooper GS and Koroukian SM. Racial disparities in the use of and indications for colorectal procedures in Medicare beneficiaries. *Cancer*, 2004. 100:418-24.
- ⁵ Govindarajan R, Shah RV, Erkman LG, *et al*. Racial differences in the outcome of patients with colorectal carcinoma. *Cancer*, 2003. 97:493-8.
- ⁶ Whynes DK, Frew EJ, Manghan CM, *et al*. Colorectal cancer, screening and survival: the influence of socio-economic deprivation. *Public Health*, 2003. 117:389-95.
- ⁷ Langenbach MR, Schmidt J, Neumann J, *et al*. Delay in treatment of colorectal cancer: multifactorial problem. *World J Surg*, 2003. 27:304-8.
- ⁸ Pagano IS, Morita SY, Dhakal S, *et al*. Time dependent ethnic convergence in colorectal cancer survival in Hawaii. *BMC Cancer*, 2003. 3:5.

Lung Cancer

Definition: Neoplasm of the lung, trachea, or bronchus. This disease is characterized by uncontrolled growth of neoplastic cells developing in the respiratory tract, with the potential to invade and spread to other sites. ICD-9 codes 162.0-162.9.

Summary

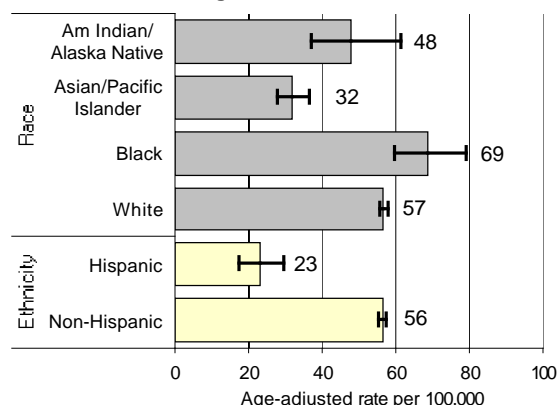
In Washington State during 2000 – 2002 combined, African Americans had the highest and Asians and Pacific Islanders the lowest age-adjusted death rates for lung cancer. Non-Hispanics had a higher mortality rate than Hispanics. As the proportion of the population that completed college increased, death rates for lung cancer decreased. Additionally, people living in areas where less than 5% of the population lived in poverty had lower death rates for lung cancer compared to people in census tracts with more poverty. The age-adjusted incidence rates for lung cancer in Washington showed similar patterns to the death rates. The age-adjusted death rates for whites and non-Hispanics decreased about 1% each year during 1990 – 2002. Rates for Hispanics showed a decline of about 5% each year. Tobacco smoking is the most common cause of lung cancer. For the most part, variations in lung cancer incidence and death were consistent with smoking patterns among the different racial, ethnic, and socioeconomic groups.

Rates

Race and Ethnicity

In Washington State for 2000 – 2002 combined, African Americans had the highest and Asians and Pacific Islanders the lowest age-adjusted death rate from lung cancer. This is similar to the national pattern.¹ Asian and Pacific Islander data should be interpreted with caution, because the data included an aggregation of subgroups that may obscure actual differences. For example, national data show rates for Hawaiians as being higher than those of whites, while rates for Chinese, Filipinos, and Japanese are much lower than those of whites.² In Washington for 2000 – 2002 combined, non-Hispanics had a higher mortality rate than Hispanics. (See Appendix A, Race and Hispanic Ethnicity.)

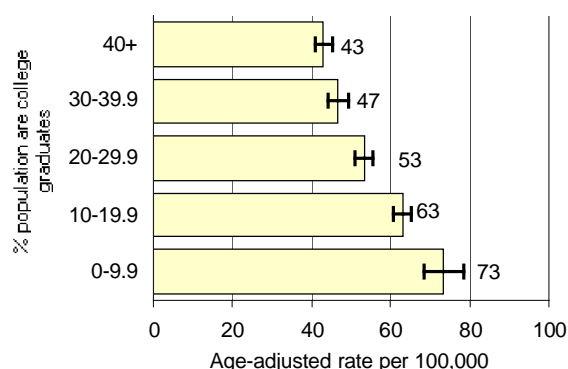
**Lung Cancer, Mortality Rates
By Race and Ethnicity
Washington State, 2000-2002**



Education

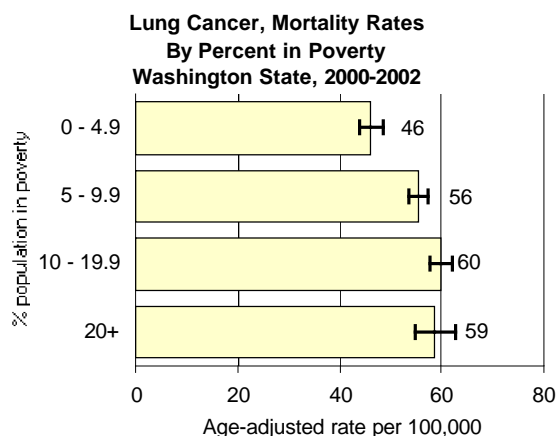
To assess the association between education and lung cancer, we assigned an educational level to each person who died of lung cancer based on the percent of people age 25 and older with a college education in the census tract in which the decedent resided at death. (See Appendix A, Education.) In Washington State for 2000 – 2002 combined, the age-adjusted death rate increased as the proportion of the population with a college degree decreased. This pattern is similar to that seen elsewhere, with consistently higher lung cancer mortality rates among less educated men and women.^{3,4}

**Lung Cancer, Mortality Rates
By Percent College Graduates
Washington State, 2000-2002**



Poverty

To study the link between poverty and lung cancer, we measured poverty as the percent of the population living at or below the federal poverty level in the census tract in which the decedent resided at death. (See Appendix A, Poverty.) In Washington State for 2000 – 2002 combined, death rates from lung cancer were lowest for people living in census tracts where less than 5% of the population lived in poverty. National data showed a complex picture of the relationship between poverty, gender, and race/ethnicity and lung cancer mortality. Nationally, living in a high poverty area was associated with increased mortality for both men and women among non-Hispanic whites and Hispanics. For African Americans, the increase in mortality for those living in high poverty areas was apparent for men only. The reverse was true for Asian and Pacific Islander women and for American Indian and Alaska Native women. For these groups, lower death rates were seen in high poverty areas. There was no clear relationship between poverty and lung cancer mortality for Asian and Pacific Islander men and for African American women.⁵



Trends

The age-adjusted death rates for whites and non-Hispanics decreased about 1% each year between 1990 and 2002. For both these groups, an increase of about 1% each year among women was outweighed by a decrease of about 2% for men. Rates for Hispanics showed a decline of about 5% each year, primarily due to a decrease of about 6% per year for Hispanic women. Rates for other race groups have remained relatively constant since 1990. (See Appendix A, Trend Analysis.)

The Health of Washington State, 2004 Supplement
Washington State Department of Health

Other Measures of Impact and Burden

Incidence

In Washington for 1999 – 2001 combined, the age-adjusted incidence rate of lung cancer was highest for African Americans and lowest for Asians and Pacific Islanders. This is similar to the national pattern.⁶ As with mortality, the rate for Asians and Pacific Islanders should be interpreted with caution. The overall low rate for Asians and Pacific Islanders obscures large differences among subgroups that are similar to those seen for mortality.² Non-Hispanics in Washington had a higher rate than Hispanics.

As with mortality, the age-adjusted incidence rate for lung cancer increased as the proportion of the population that completed college decreased. Incidence rates also increased as the percent of the population living in poverty increased.

Smoking

Tobacco smoking is the most common risk factor for lung cancer. Data from the Washington Behavioral Risk Factor Surveillance System (BRFSS) for 1998 – 2000 combined indicated that people with lower incomes and educational levels were more likely to smoke.⁷

The low rates of lung cancer for Asians and Pacific Islanders are consistent with relatively low levels of smoking reported in the 1998 – 2000 Washington BRFSS.⁷ As with mortality and incidence, however, the data may obscure large differences in tobacco use by subgroups within the Asian and Pacific Islander population.⁸ Based on the same BRFSS data, American Indians and Alaska Natives appeared to experience relatively low incidence and death from lung cancer, and African Americans had relatively high rates compared to their reported smoking prevalence. Because lung cancer takes a long time to develop, current smoking information might be a better indication of *future* risk for lung cancer and reflect current patterns only if smoking habits have not changed for several decades. These apparent discrepancies between smoking and lung cancer rates also suggest influences other than smoking, such as differences in genetic susceptibility, exposure to air pollution, and for mortality, access to and quality of health care.^{9, 10}

The overall low rates of lung cancer among Hispanics are consistent with relatively low levels

of smoking. Unpublished data from a Department of Health survey indicate that when BRFSS-like surveys are offered in Spanish, as well as English, people identifying themselves as Hispanic report smoking about half as often as non-Hispanics.¹¹

For More Information

Lung Cancer Chapter, *2002 Health of Washington State*,
http://www.doh.wa.gov/HWS/doc/CD/CD_LCN.doc.

Tobacco Use and Exposure Chapter, *2002 Health of Washington State*,
http://www.doh.wa.gov/HWS/doc/RPF/RPF_Tob.doc.

Tobacco strategies for disparities,
<http://www.doh.wa.gov/Tobacco/disparities/disparity.htm>.

Data Sources (For additional detail, see Appendix B.)

State death data: Vital Registration System Annual Statistical Files, Washington State Deaths 1980-2002 CD-ROM issued November 2003.

Cancer incidence data: Washington State Cancer Registry, 2003 Release.

Population data for race and ethnicity: U.S. Census for 1990; National Center for Health Statistics bridged race population counts for 2000, 2001 and 2002; Public Health – Seattle & King County intercensal interpolations for 1991 – 1999, EPE Unit, February 2003.

Population data for education and poverty: U.S. Census 2000 Summary File 3, Tables P37 and P87 available through American Fact Finder,
http://factfinder.census.gov/home/saff/main.html?_lang=en.
Downloaded December 2003.

References

¹ Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Mortality - All COD, Public-Use With State, Total U.S. (1969-2000), National Cancer Institute, DCCPS, Surveillance Research Program, Cancer Statistics Branch, released April 2003. Underlying mortality data provided by NCHS (www.cdc.gov/nchs).

² Miller BA, Kolonel LN, Bernstein L, et al. (eds). *Racial/Ethnic Patterns of Cancer in the United States 1988-1992*, National Cancer Institute. NIH Pub. No/ 96-4104. Bethesda, MD, 1996.

³ Mackenbach JP, Huisman M, Andersen O, et al. Inequalities in lung cancer mortality by the educational level in 10 European populations. *Eur J Cancer*, 2004. 40:126-35.

⁴ Mackenbach JP, Bos V, Andersen O, et al. Widening socioeconomic inequalities in mortality in six Western European countries. *Int J Epidemiol*, 2003. 32:830-7.

⁵ Singh GK, Miller BA, Hankey BF, Edwards BK. *Area Socioeconomic Variations in U.S. Cancer Incidence, Mortality, Stage, Treatment, and Survival, 1975-1999*. NCI Cancer Surveillance Monograph Series, Number 4. Bethesda, MD: National Cancer Institute, 2003. NIH Publication No. 03-5417.

⁶ U.S. Cancer Statistics Working Group. *United States Cancer Statistics: 2000 Incidence*. Atlanta (GA): Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; 2003.

⁷ Washington State Department of Health. *Health of Washington State. Tobacco Use and Exposure*. Olympia, WA, 2002 Aug [cited 2004, March 23rd] 418p. Available from <http://www.doh.wa.gov/HWS>.

⁸ U.S. Department of Health and Human Services. *Tobacco Use Among U.S. Racial/Ethnic Minority Groups - African Americans, American Indians and Alaska Natives, Asian Americans and Pacific Islanders, and Hispanics: A Report of the Surgeon General*. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 1998.

⁹ Gadgeel SM and Kalemkerian GP. Racial differences in lung cancer. *Cancer Metastasis Rev*, 2003. 22:39-46.

¹⁰ Bach PB, Cramer LD, Warren JL, et al. Racial differences in the treatment of early-stage lung cancer. *N Engl J Med*, 1999. 341:1198-205.

¹¹ Washington State Department of Health. *Tobacco Prevention and Control Program. Behavioral Risk Factor Surveillance System, Race and Ethnicity Over Sample*. 2002.

Melanoma of the Skin

Definition: Melanoma of the skin is characterized by uncontrolled growth of neoplastic cells developing from the melanocytes in the skin with the potential to invade and spread to other sites. In the Washington State Cancer Registry, new cases of melanoma are coded to ICD-O codes C44.0—C44.9 with morphology codes 8720—8790.

Summary

Similar to the national pattern, in Washington State for 1999 – 2001 combined, whites had the highest and Asians and Pacific Islanders and African Americans the lowest age-adjusted incidence rates of melanoma. Non-Hispanics had a higher rate than Hispanics. There was a significant increase in the age-adjusted incidence rates during 1992 – 2001 for both whites and non-Hispanics. Melanoma incidence rates in Washington were higher in areas where a higher proportion of the population completed college and in areas with a lower proportion of population living in poverty. These findings are consistent with studies showing that melanoma is associated with higher socioeconomic status.

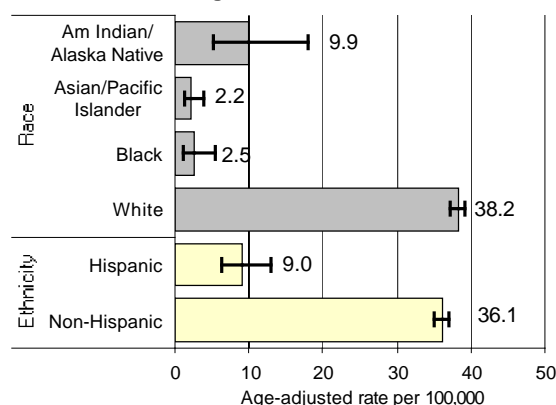
It is not clear how much of the higher incidence of melanoma for whites is due to their susceptibility to the cancer-causing effects of sunlight and how much is related to whites being disproportionately represented in higher socioeconomic groups potentially associated with lifestyle and behavioral factors that increase the risk of melanoma or its detection.

Rates

Race and Ethnicity

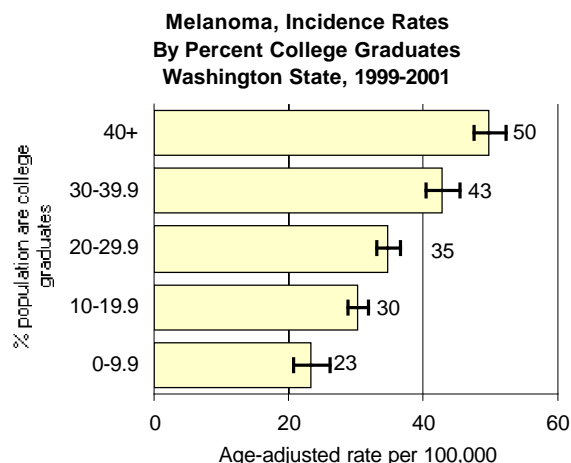
In Washington State, whites had the highest age-adjusted incidence rate of melanoma for 1999 – 2001 combined. Asians and Pacific Islanders and African Americans had the lowest rates, and Hispanics had a lower incidence rate than non-Hispanics. The high rates among whites and low rates among Asians and Pacific Islanders and African Americans mirror the national pattern.¹ Furthermore, the high incidence among whites and non-Hispanics is supported by studies demonstrating that white non-Hispanics experience sunburns—a strong determinant of melanoma risk—more frequently than people of other races and ethnicities.^{2,3} (See Appendix A, Race and Hispanic Ethnicity.)

**Melanoma, Incidence Rates
By Race and Ethnicity
Washington State, 1999-2001**



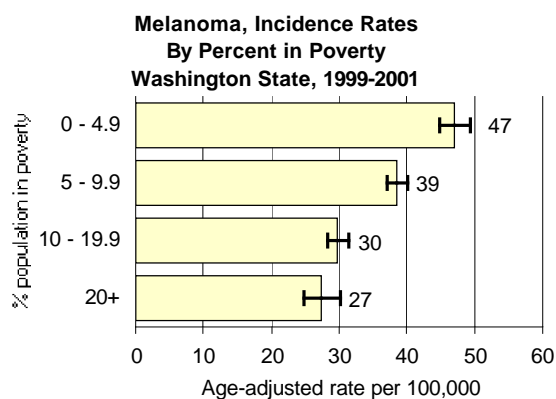
Education

To assess the association between education and melanoma incidence, we assigned an educational level to each person diagnosed with melanoma based on the percent of people age 25 and older with a college education in the census tract in which the individual lived at the time of diagnosis. (See Appendix A, Education.) In Washington for 1999 – 2001 combined, the age-adjusted incidence rate of melanoma rose as the proportion of the population completing college increased. This is consistent with studies showing that college graduates⁴ and people holding professional jobs^{5,6} (an indication of higher level of education) have an excess of melanoma. This finding is also consistent with 1999 data from the Washington Behavioral Risk Factor Surveillance System (BRFSS) showing that Washingtonians with relatively more education were more likely to report sunburn in the last year compared to people with lower educational levels.⁷ It is not clear how much of the association between higher level of education and higher incidence of melanoma is due to lifestyle behaviors that modify exposure to sunlight or some other factor, such as more frequent screening among those with more education,⁸ and how much is the result of whites being both more likely to develop melanoma and to have relatively high levels of formal education.



Poverty

To study the link between poverty and melanoma, we measured poverty as the percent of the population living at or below the federal poverty level in the census tract in which the individual lived at the time of diagnosis. (See Appendix A, Poverty.) In Washington for 1999 – 2001 combined, the age-adjusted incidence rate of melanoma increased as the proportion of the population living in poverty decreased. Additionally, people in census tracts where less than 10% of the population lived in poverty had significantly higher incidence rates compared to people in census tracts with higher levels of poverty. This is consistent with studies showing melanoma to be associated with higher socioeconomic status, as measured by type of occupation,^{5,6} or by percentage of families below poverty.⁹



This finding is consistent with 1999 data from the BRFSS showing that Washingtonians with annual household incomes of more than \$50,000 were more likely to report a sunburn in the last year

compared to people with lower incomes.⁷ As with education, it is not clear how much of the association between affluence and the incidence of melanoma reflects lifestyles⁸ and how much is related to whites being both more likely to develop melanoma and more likely to be relatively affluent.

Trends

Age-adjusted incidence rates for melanoma for 1992 – 2001 have been increasing about 5% each year for whites and non-Hispanics. The rates for Asians and Pacific Islanders, American Indians and Alaska Natives, and Hispanics did not vary greatly over time. We were unable to assess changes for African Americans because of the low number diagnosed with melanoma each year. (See Appendix A, Trend Analysis.)

Other Measures of Impact and Burden

Fortunately, death from melanoma is relatively rare. We were unable to compare melanoma death rates by race and ethnicity, because there were very few deaths in groups other than white and non-Hispanic. Additionally, in contrast to incidence, there was no clear relationship between death rates due to melanoma and either the percent of the population with college degrees or the percent living in poverty. This may be due to relatively good survival of people with relatively more economic resources and higher levels of education.^{8,10}

For More Information

Melanoma of the Skin Chapter, 2002 *Health of Washington State*, http://www.doh.wa.gov/HWS/doc/CD/CD_MEL.doc.

Data Sources (For additional detail, see Appendix B.)

State death data: Vital Registration System Annual Statistical Files, Washington State Deaths 1980-2002 CD-ROM issued November 2003.

Cancer incidence data: Washington State Cancer Registry, 2003 Release.

Population data for race and ethnicity: U.S. Census for 1990; National Center for Health Statistics bridged race population counts for 2000, 2001 and 2002; Public Health – Seattle & King County intercensal interpolations for 1991 – 1999, EPE Unit, February 2003.

Population data for education and poverty: U.S. Census 2000 Summary File 3, Tables P37 and P87 available through American Fact Finder, http://factfinder.census.gov/home/saff/main.html?_lang=en. Downloaded December 2003.

References

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- ¹⁰ Van Durme DJ, Ferrante JM, Pal N, Wathington D, Roetzheim RG, Gonzalez EC. Demographic predictors of melanoma stage at diagnosis. *Arch Fam Med*. 2000 Jul;9(7):606-11.

Diabetes

Definition: A chronic condition characterized by an inability to produce and/or properly utilize the hormone insulin which plays a central role in the metabolism of sugar (glucose) in the body. Ten percent of people with diabetes have type 1 diabetes mellitus, characterized by lack of insulin production. Ninety percent of people with diabetes have type 2 diabetes mellitus, characterized by ineffective utilization of insulin. ICD-9 code 250, ICD-10 codes E10-E14.

Summary

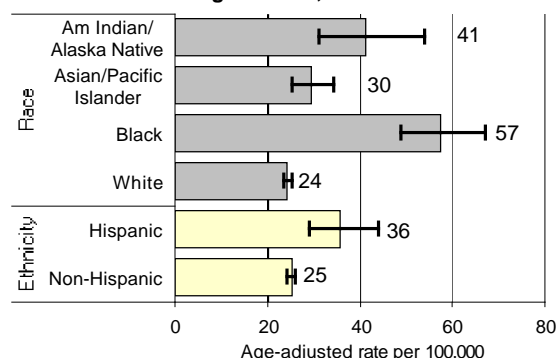
In Washington State for 2000 – 2002 combined, age-adjusted death rates from diabetes were higher among African Americans, American Indians and Alaska Natives, and Asians and Pacific Islanders compared to whites. Rates were also higher among Hispanics compared to non-Hispanics. Death rates from diabetes in Washington increased as the percent of the population that has completed college decreased and as the proportion living in poverty increased. A national study showed that lower socioeconomic status is associated with higher Type 2 diabetes prevalence among women of all racial and ethnic groups, but this finding is not consistently found among men.¹ Diabetes prevalence appears to be more strongly associated with poverty than with education or occupational status.

Rates

Race and Ethnicity

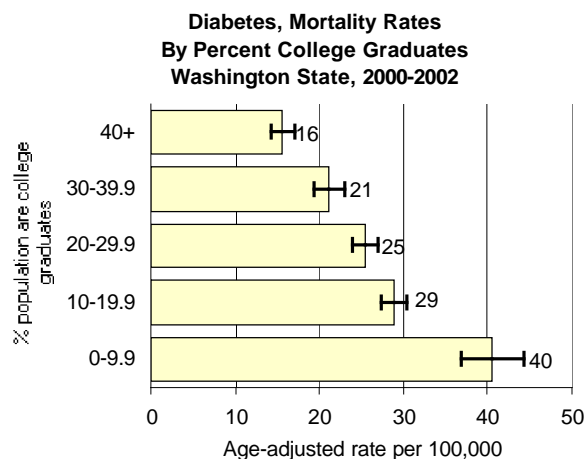
In Washington State, age-adjusted deaths rates from diabetes for 2000 – 2002 combined were lower for whites than other racial groups. For example, the African American rate of death due to diabetes was more than twice that of whites. Rates were also higher among Hispanics compared to non-Hispanics. Washington follows the national pattern for diabetes death rates by race. However, the death rate for diabetes for Asians and Pacific Islanders in Washington is higher than for this group nationally.² (See Appendix A, Race and Hispanic Ethnicity.)

**Diabetes, Mortality Rates
By Race and Ethnicity
Washington State, 2000-2002**



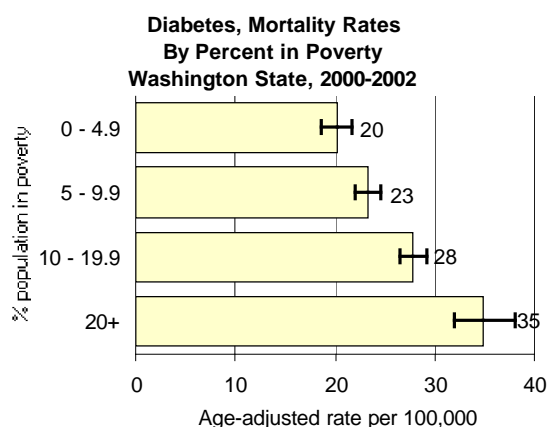
Education

To assess the association between diabetes and education, we assigned an educational level to each person who died of diabetes based on the percent of people age 25 and older with a college education in the census tract in which the decedent resided at death. (See Appendix A, Education.) In Washington for 2000 – 2002 combined, the age-adjusted rate of diabetes mortality decreased as the percent of college graduates increased. This is consistent with findings that people with higher levels of education are less likely to have risk factors for diabetes, including obesity, poor nutrition, and sedentary behavior.³



Poverty

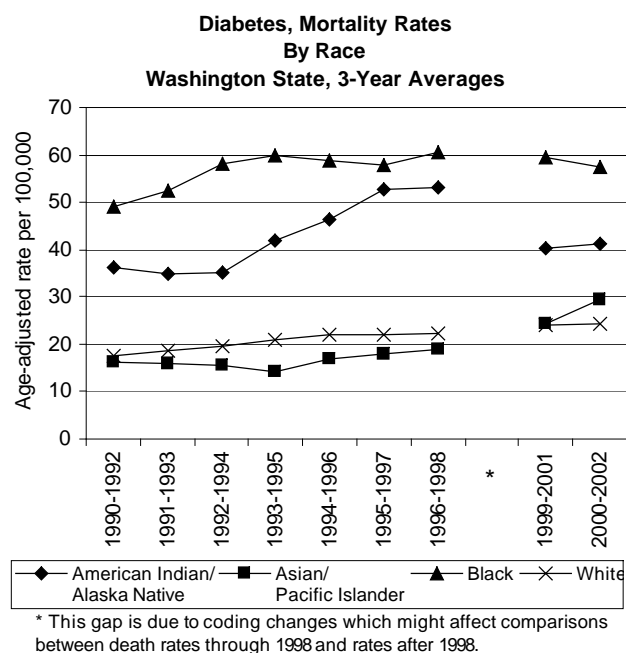
To study the link between poverty and diabetes, we measured poverty as the percent of the population that lived at or below the federal poverty level in the census tract in which the decedent resided at death. (See Appendix A, Poverty.) In Washington for 2000 – 2002 combined, the age-adjusted death rate for diabetes increased as poverty increased. Poverty is associated with increased levels of obesity,⁴ a major risk factor for Type 2 diabetes. Lifestyle, including diet and physical activity, has a dramatic impact on the prevention and control of diabetes.⁵ Yet access to healthy foods and opportunities for physical activity are often limited for people living in poverty.⁶

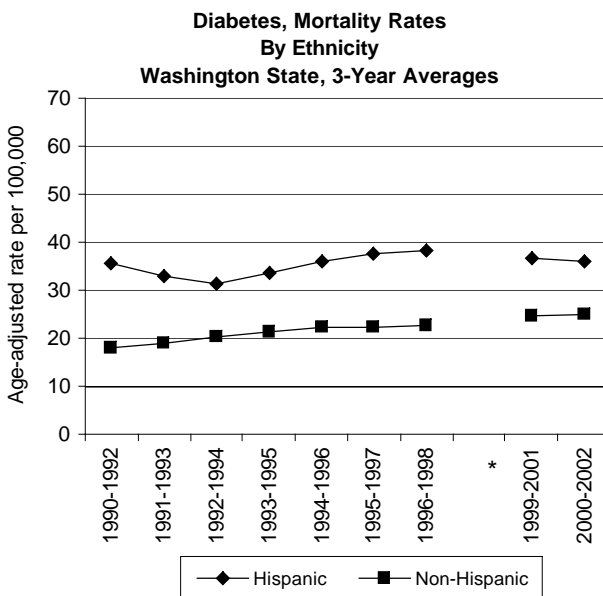


Trends

The overall death rate from diabetes in the United States has remained fairly constant over the past 50 years, although rates for African Americans

and American Indians and Alaska Natives have been increasing.⁷ These general trends are not seen currently in Washington. Beginning in 1990, rates of diabetes-related deaths have been increasing by about 8% per year among Asians and Pacific Islanders, about 3% per year for non-Hispanics, and 2% per year for whites. Rates for African Americans, American Indians and Alaska Natives, and Hispanics fluctuated during this period, but they did not show consistent increases or decreases. African Americans and American Indians and Alaska Natives experienced diabetes mortality rates that were higher than those of whites throughout this period. (See Appendix A, Trend Analysis.)





* This gap is due to coding changes which might affect comparisons between death rates through 1998 and rates after 1998.

Interventions

The Guide to Community Preventive Services⁸ recommends a number of evidence-based interventions within the health care system that are designed to eliminate health disparities. These include programs to recruit and retain staff who reflect the cultural diversity of the community, the use of interpreter services or bilingual providers, cultural competency training for health care providers, the use of linguistically and culturally appropriate health education materials, and culturally specific health care settings. These strategies to eliminate differences in the quality of diabetes care for a diversity of racial and ethnic groups can be combined with other measures to improve the quality of care overall, such as those implemented by the Washington State Collaborative. For more information regarding the Washington State Collaborative and other interventions for diabetes, please see the Diabetes Chapter in the *2002 Health of Washington State*.

For More Information

Department of Health Diabetes Program. Telephone: (360) 236-3608

Diabetes Chapter, *2002 Health of Washington State*, http://www.doh.wa.gov/HWS/doc/CD/CD_DIAB.doc.

Data Sources (For additional detail, see Appendix B.)

State death data: Vital Registration System Annual Statistical Files, Washington State Deaths 1980-2002 CD-ROM issued November 2003.

Population data for race and ethnicity: U.S. Census for 1990; National Center for Health Statistics bridged race population counts for 2000, 2001 and 2002; Public Health – Seattle & King County intercensal interpolations for 1991 – 1999, EPE Unit, February 2003.

Population data for education and poverty: U.S. Census 2000 Summary File 3, Tables P37 and P87 available through American Fact Finder, http://factfinder.census.gov/home/saff/main.html?_lang=en. Downloaded December 2003.

References

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- ⁵ Knowler WC, Barrett-Connor E, Fowler SE, et al. Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *N Engl J Med* 2002 Feb 7;346(6):393-403.
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Injury and Violence

Key Findings

In Washington State, age-adjusted injury death rates from causes included in this section are generally lowest for Asian and Pacific Islanders and highest for American Indians and Alaska Natives. There are a few exceptions. African Americans have the lowest suicide rate and highest homicide rate, although this latter disparity has decreased since 1990. Whites have a suicide rate similar to that of American Indians and Alaska Natives and a homicide rate similar to that of Asians and Pacific Islanders. Compared to non-Hispanics, Hispanics have relatively high age-adjusted motor vehicle-related death rates and high homicide rates, but they have relatively low rates of suicide.

In Washington State and nationally, injury death rates increase as poverty increases and as educational attainment decreases. In general, people with lower incomes and education live and work in more hazardous environments that may increase their risk of injury. Poorer neighborhoods may be characterized by substandard and overcrowded housing, lack of safe recreational facilities for children, proximity of housing to busy streets, increased exposure to physical hazards, and limited access to health care. Individuals with few economic resources or little formal education are less likely to use safety devices due to lack of money. They are more likely to lack transportation to obtain safety devices, to lack control over housing conditions, and to believe that injuries are preventable.^{1,2} People who do not consider injuries to be preventable, because of a lack of information or other reasons, may be less likely to practice effective injury-prevention measures.

For homicide, the higher death rate among African Americans either disappears or is greatly reduced after controlling for socioeconomic factors.^{3,4} For the other injury topics covered in this supplement, the interactions of race, ethnicity, poverty, and education have not been widely researched. Such research is needed to determine the relative

importance of these factors to help tailor interventions to reduce injury.

Chapters Excluded

This section does not include all of the chapters in the Injury and Violence section of the *2002 Health of Washington State*. Those that are excluded are

- Falls Among Older Adults
- Youth Violence
- Domestic Violence
- Child Abuse

The chapter on falls among persons older than 65 years was not included because of the small number of deaths due to falls among most of the race and ethnic groups featured in this supplement (American Indians and Alaska Natives, African Americans, and Hispanics). In addition, death rates among whites, Asian and Pacific Islanders, and non-Hispanics did not differ significantly from each other.

The chapter on youth violence in the *2002 Health of Washington State* provided Washington data by race and ethnicity and additional data are not readily available. Similarly, the chapters on domestic violence and child abuse were excluded, because data by race and ethnic group in Washington State are not readily available in a format compatible with that used in this document.

Interventions

Intervention strategies for preventing injuries and violence have not been included in the *2004 Supplement*, because they are not different from those discussed in the *2002 Health of Washington State* for the general population. To the extent that injuries are associated with substandard and overcrowded housing, lack of safe recreational opportunities, and lack of access to affordable safety devices, addressing these issues would be expected to decrease relatively high rates of injury deaths for people living in poorer neighborhoods and for those with less formal education.

References

¹ National SAFE KIDS Campaign (NSKC). Children at Risk Fact Sheet. Washington (DC): NSKC, 2004.

² Cubbin C, Smith GS. Socioeconomic inequalities in injury: critical issues in design and analysis. *Annu Rev Public Health* 2002;23:349-75.

³ Cubbin C, LeClere FB, Smith GS. Socioeconomic status and the occurrence of fatal and nonfatal injury in the United States. *Am J Public Health*. 2000 Jan;90(1):70-7.

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Motor Vehicle Deaths

Summary

In Washington State, age-adjusted motor vehicle death rates are higher for American Indians and Alaska Natives compared to other race groups, and for Hispanics compared to non-Hispanics. Throughout the 1990s and early 2000s, the disparity for American Indians and Alaska Natives has remained large. American Indians and Alaska Natives also have higher rates nationally compared to other groups. National data also suggest that African Americans and Hispanic men may be at higher risk of death due to motor vehicle injuries compared to non-Hispanic whites. After adjusting for vehicle miles traveled and educational level, African Americans—but not Hispanic men—remain at higher risk of death.¹ In Washington for 2000 – 2002 combined, death rates from motor vehicle crashes increased as neighborhood poverty increased and as the percent of the population with a college education decreased. National data suggest that African Americans and persons with lower incomes and educational attainment are less likely to wear their seat belts.² The relative importance of race, ethnicity, poverty, and education in motor vehicle deaths has not been widely researched.

Rates

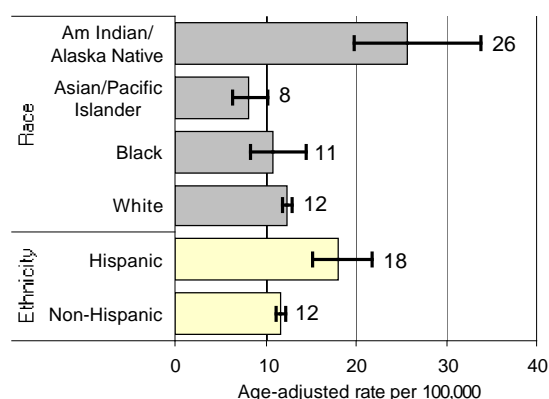
Race and Ethnicity

In Washington State from 2000 – 2002 combined, age-adjusted death rates from motor vehicle injuries were higher for American Indians and Alaska Natives compared to other race groups, and for Hispanics compared to non-Hispanics. (See Appendix A, Race and Hispanic Ethnicity.) Nationally, American Indians and Alaska Natives have markedly higher death rates from motor vehicle injuries than people in other race groups.³

Definition: All unintentional motor vehicle-related deaths, including those involving drivers, passengers, pedestrians, motorcyclists, and bicyclists. For years 1980 through 1998, motor vehicle deaths include all death records with an underlying cause of death in the range of E810-E825. For 1999 through 2002, the applicable underlying cause of codes include V02-V04, V09.0, V09.2, V12-V14, V19.0-V19.2, V19.4-V19.6, V20-V79, V80.3-V80.5, V81.0-V81.1, V82.0-V82.1, V83-V86, V87.0-V87.8, V88.0-V88.8, V89.0, and V89.2

National data also suggest that African Americans and Hispanic men have a higher risk of death due to motor vehicle injuries compared to non-Hispanic whites. After adjusting for vehicle miles traveled and educational level, African Americans—but not Hispanic men—remain at higher risk of death.¹ Nationally, data suggest that African Americans are somewhat less likely to report wearing their seat belts all the time compared to whites.²

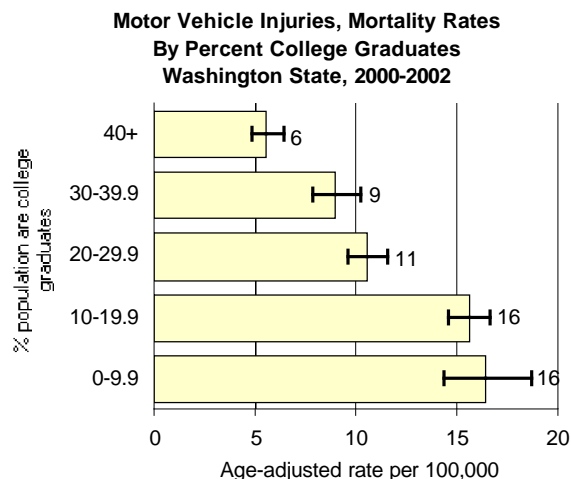
**Motor Vehicle Injuries, Mortality Rates
By Race and Ethnicity
Washington State, 2000-2002**



Education

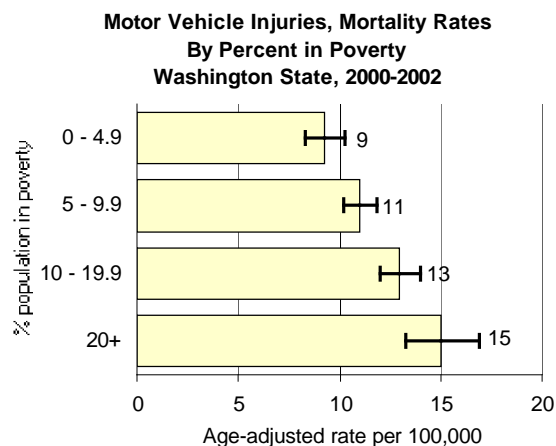
To assess the association between education and motor vehicle-related deaths, we assigned an educational level to each person who died from a motor vehicle-related incident based on the percent of people age 25 and older with a college education in the census tract in which the person resided at death. (See Appendix A, Education.) In Washington for 2000 – 2002 combined, people living in census tracts where a greater proportion of the population completed college had lower death rates due to motor vehicle injuries compared to people in tracts where a lower proportion of the population completed college. This is consistent with national data showing that the rate of motor vehicle deaths is lower for people with at least

some college education.³ Data suggest that the more years of formal schooling people have, the more likely they are to report wearing their seat belts all the time and to place their children in car safety seats.²



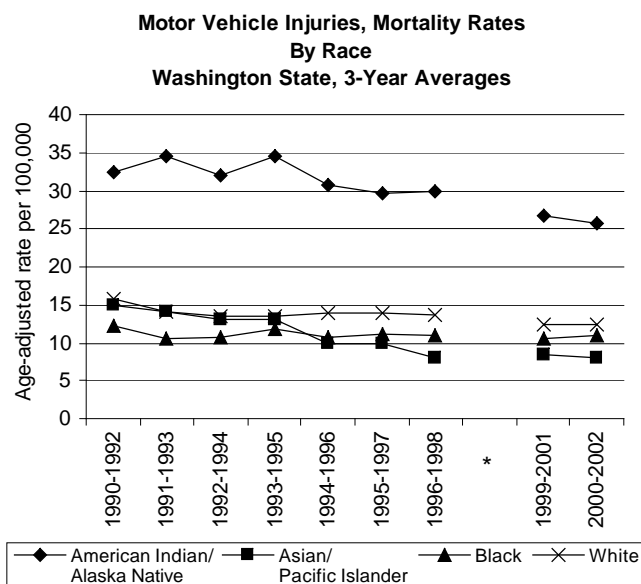
Poverty

To study the link between poverty and motor vehicle-related deaths, we measured poverty as the percent of the population that lived at or below the federal poverty level in the census tract in which the person who died resided at death. (See Appendix A, Poverty.) In Washington for 2000 – 2002 combined, the age-adjusted death rate due to motor vehicle injuries increased as the percent of the population in poverty increased. This is consistent with national data showing that the rate of motor vehicle deaths is higher for people with lower incomes.⁴ In one national survey, persons in low income households were less likely to report wearing their seat belts all the time or place their children in car safety seats compared to persons in higher income households.²



Trends

Since 1990, age-adjusted motor vehicle death rates have declined about 6% each year for Asians and Pacific Islanders, about 3% for American Indians and Alaska Natives, and about 2% each year for whites, but they have remained stable for African Americans. (See Appendix A, Trend Analysis.) Throughout the 1990s and early 2000s, the disparity for American Indians and Alaska Natives has remained large. Motor vehicle death rates for Hispanics and non-Hispanics have declined about 4% and 3% each year, respectively, since 1990.



* This gap is due to coding changes which might affect comparisons between death rates through 1998 and rates after 1998.

For More Information

Department of Health Injury Prevention Program. Telephone: (360) 236-3616, Email: injury.data@doh.wa.gov

Motor Vehicle Deaths Chapter, *2002 Health of Washington State*, http://www.doh.wa.gov/HWS/doc/IV/IV_MV.doc.

Data Sources (For additional detail, see Appendix B.)

State death data: Vital Registration System Annual Statistical Files, Washington State Deaths 1980-2002 CD-ROM issued November 2003.

Population data for race and ethnicity: U.S. Census for 1990; National Center for Health Statistics bridged race population counts for 2000, 2001 and 2002; Public Health – Seattle & King County intercensal interpolations for 1991 – 1999, EPE Unit, February 2003.

Population data for education and poverty: U.S. Census 2000 Summary File 3, Tables P37 and P87 available through American Fact Finder, http://factfinder.census.gov/home/saff/main.html?_lang=en. Downloaded December 2003.

References

¹ Braver ER. Race, Hispanic origin, and socioeconomic status in relation to motor vehicle occupant death rates and risk factors among adults. *Accident Anal Prev* 25:355-364.

² National Highway Traffic Safety Administration, Office of Research and Traffic Records, 1998 Motor Vehicle Occupant Safety Survey: Volume 2, March 2000.

³ U.S. Department of Health and Human Services. *Healthy People 2010*. 2nd ed. With Understanding and Improving Health and Objectives for Improving Health. 2 vols. Washington, DC: U.S. Government Printing Office, November 2000.

⁴ Cubbin C, LeClere FB, Smith GS. Socioeconomic status and the occurrence of fatal and nonfatal injury in the United States. *Am J Public Health*. 2000 Jan;90(1):70-7.

Drowning

Definition: Drowning is death from a submersion event. For years 1980 through 1998, the applicable ICD9 codes are E830, E832, E910. For years 1999 through 2002, the applicable ICD-10 codes are V90, V92, W65–W74, X71, X92, Y21.

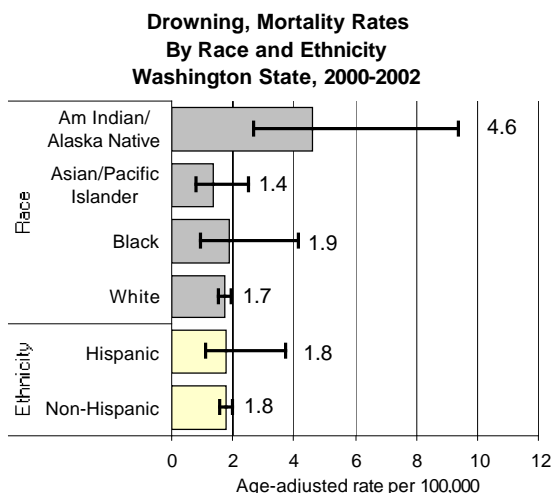
Summary

In Washington State and nationally, age-adjusted drowning rates are higher among American Indians and Alaska Natives compared to other race groups. Nationally, African Americans also have higher age-adjusted drowning rates. In Washington, age-adjusted death rates for drowning increase as poverty increases and as educational attainment decreases. Possible reasons may include lack of parental supervision while children are in the bathtub and a more limited understanding of child safety among low income families.^{1,2} The interaction of race, ethnicity, poverty and education for drowning rates has not been widely researched.

Rates

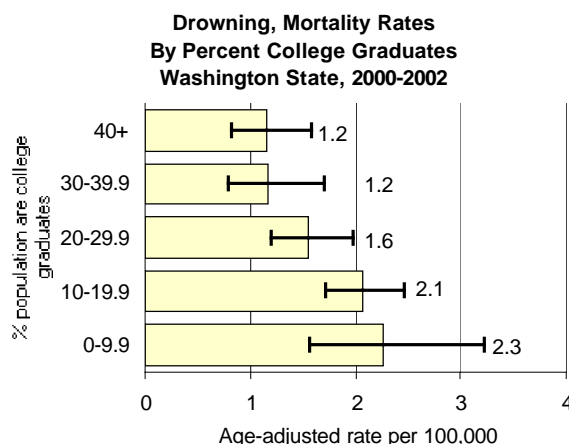
Race and Ethnicity

In Washington State for 2000 – 2002 combined, age-adjusted drowning rates were higher among American Indians and Alaska Natives compared to other race groups. American Indians and Alaska Natives also have relatively high rates of drowning nationally, as do African Americans. (See Appendix A, Race and Hispanic Ethnicity.)



Education

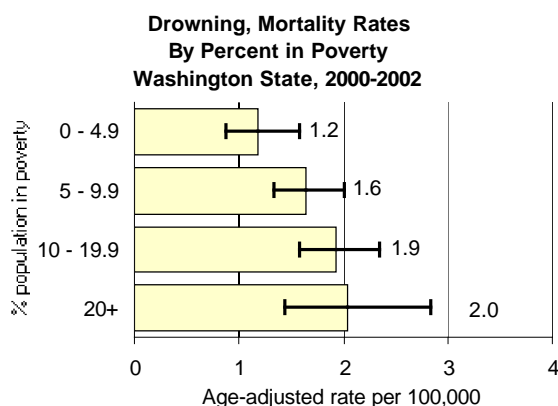
To assess the association between education and drowning, we assigned an educational level to each person who drowned based on the percent of people age 25 and older with a college education in the census tract in which the person who drowned resided at death. (See Appendix A, Education.) In Washington for 2000 – 2002 combined, people living in census tracts where a greater proportion of the population completed college had lower age-adjusted drowning rates compared to those in tracts where a smaller proportion completed college. A similar finding has been found at a national level.³



The reasons for this finding have not been studied specifically for drowning, however, general findings related to increased injury among people with less formal education might apply. In general, people with less formal education are more likely to live in neighborhoods that lack safe recreational facilities for children. They are less likely to use safety devices due to lack of money, to access transportation to obtain safety devices, and to believe that injuries are preventable.^{1,4} People who do not believe that injuries are preventable—perhaps because of a lack of information—may be less likely to practice effective injury-prevention measures.

Poverty

To study the link between poverty and drowning, we measured poverty as the percent of the population that was at or below the federal poverty level in the census tract in which the person who drowned resided at death. (See Appendix A, Poverty.) In Washington for 2000 – 2002 combined, people living in census tracts where the lowest proportion of the population lived in poverty had lower age-adjusted drowning rates compared to those in tracts where the greatest proportion of the population lived in poverty. This is consistent with findings that children in low income families are four times more likely to drown than children in higher income families.¹ Possible explanations include lack of parental supervision in the bathtub² and more limited understanding of child safety.¹ Several of the factors discussed in the education section, above, also apply to people living in poorer neighborhoods or below the federal poverty level.



Trends

Since 1990, age-adjusted drowning rates declined about 3% per year for whites and non-Hispanics, but no change has been observed in the other race and ethnic groups. Because of the small number of drowning deaths in the other race and ethnic groups, the ability to detect a significant trend in death rates over time is limited. Thus, these data do not necessarily represent an increase in disparities since 1990. (See Appendix A, Trend Analysis.)

For More Information

Department of Health Injury Prevention Program. Telephone: (360) 236-3616, Email: injury.data@doh.wa.gov
Drowning Chapter, 2002 *Health of Washington State*,
http://www.doh.wa.gov/HWS/doc/IV/IV_DRN.doc.

Data Sources (For additional detail, see Appendix B.)

State death data: Vital Registration System Annual Statistical Files, Washington State Deaths 1980-2002 CD-ROM issued November 2003.

Population data for race and ethnicity: U.S. Census for 1990; National Center for Health Statistics bridged race population counts for 2000, 2001 and 2002; Public Health – Seattle & King County intercensal interpolations for 1991 – 1999, EPE Unit, February 2003.

Population data for education and poverty: U.S. Census 2000 Summary File 3, Tables P37 and P87 available through American Fact Finder,
http://factfinder.census.gov/home/saff/main.html?_lang=en.
Downloaded December 2003.

References

- ¹ National SAFE KIDS Campaign (NSKC). Children at Risk Fact Sheet. Washington (DC): NSKC, 2004.
- ² Santer LJ, Stocking CB. Safety practices and living conditions of low-income urban families. *Pediatrics* 1991;88(6):1112-8.
- ³ U.S. Department of Health and Human Services. *Healthy People 2010*. 2nd ed. With Understanding and Improving Health and Objectives for Improving Health. 2 vols. Washington, DC: U.S. Government Printing Office, November 2000.
- ⁴ Cubbin C, Smith GS. Socioeconomic inequalities in injury: critical issues in design and analysis. *Annu Rev Public Health* 2002;23:349-75.

Traumatic Brain Injury Deaths

Summary

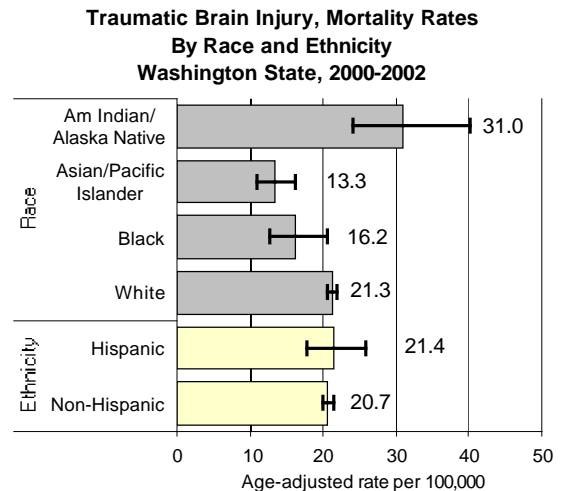
In Washington State, age-adjusted death rates from traumatic brain injury (TBI) are higher for American Indians and Alaska Natives compared to people in other race groups. These rates have not declined since 1990, and so the disparity between American Indians and Alaska Natives and other race groups has not decreased. Nationally, African Americans have higher age-adjusted death rates due to traumatic brain injury compared to whites, but this is not seen in Washington. In this state, death rates from TBI increase as poverty increases and as educational attainment decreases. The main causes of TBI deaths are firearm-related suicides and motor vehicle crashes. Higher death rates due to suicide and motor vehicle crashes among those with lower income and education may help explain the higher TBI death rates in these groups. The interactions of race, ethnicity, poverty, and education for motor vehicle injuries have not been widely researched.

Rates

Race and Ethnicity

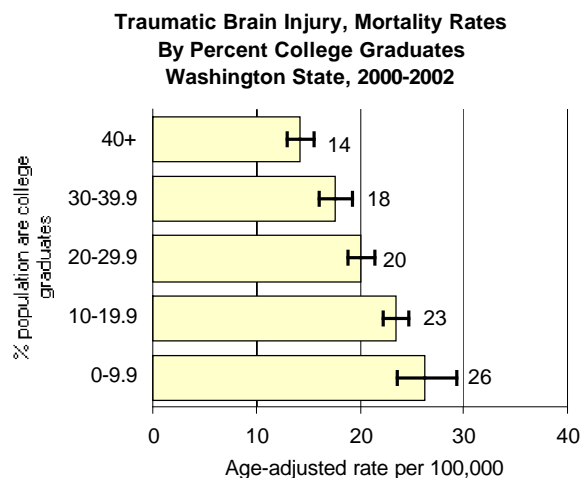
In Washington State from 2000 – 2002 combined, age-adjusted death rates from traumatic brain injury (TBI) were higher for American Indians and Alaska Natives compared to people in other race groups. Nationally, age-adjusted death rates from this cause are higher for American Indians and Alaska Natives and for African Americans compared to whites.¹ (See Appendix A, Race and Hispanic Ethnicity.)

Definition: Traumatic brain injury deaths for years 1988 through 1998 include all death records with a code of 800.0-801.9, 803.0-804.9, 850.0-854.1, 905.0 or 907.0 in any of the multi-cause of death fields. For 1999 and later, traumatic brain injury deaths include all death records with a code of S01.0-S01.9, S020-S02.1, S02.3, S02.7-S02.9, S060.0-S06.9, S07.0-S07.1, S07.8-S07.9, S09.7-S09.9, T01.0, T02.0, T04.0, T06.0, T90.1-T90.2, T90.4-T90.5, or T90.8-T90.9 in any of the multiple cause of death fields.



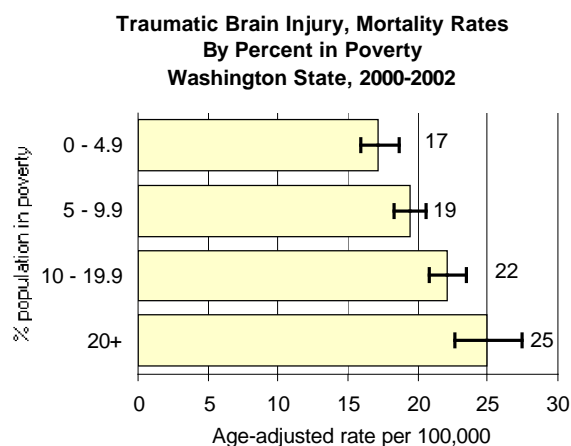
Education

To assess the association between education and TBI, we assigned an educational level to each person who died of TBI based on the percent of people age 25 and older with a college education in the census tract in which the person resided at death. (See Appendix A, Education.) In Washington for 2000 – 2002 combined, as the proportion of the population that completed college increased, TBI age-adjusted death rates decreased. Nationally, mild and moderate TBI incidence is lower among people living in households where at least one member had some college education compared to those with no college education.² Since the main causes of TBI deaths are firearm-related suicides and motor vehicle crashes, higher death rates due to suicides and motor vehicle crashes among those with lower education may help explain the higher TBI death rates. (See chapters on Motor Vehicle Deaths and Suicide.)



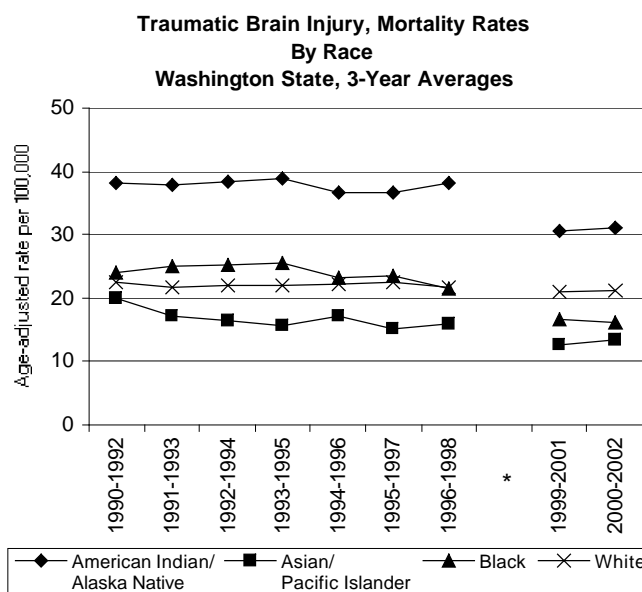
Poverty

To study the link between poverty and TBI, we measured poverty as the percent of the population that lived at or below the federal poverty level in the census tract in which the person who died of TBI resided at death. (See Appendix A, Poverty.) In Washington for 2000 – 2002 combined, as the proportion of people living in poverty increased, the age-adjusted death rate from TBI also increased. Nationally, hospitalization and emergency department visit rates due to TBI are higher among those with annual household incomes of less than \$20,000 compared to those with higher incomes.² Since the main causes of TBI deaths are firearm-related suicides and motor vehicle crashes, higher death rates for suicides and motor vehicle crashes among those with lower income may help explain the higher TBI death rates. (See chapters on Motor Vehicle Deaths and Suicide.)



Trends

Since 1990, TBI age-adjusted death rates have declined for all race and ethnic groups. The largest decline was about 4% per year for African Americans, while whites and non-Hispanics experienced the smallest declines, about 1% per year. The relatively large disparity between American Indians and Alaska Natives and other race groups did not decrease substantially during the 1990s. (See Appendix A, Trend Analysis.)



* This gap is due to coding changes which might affect comparisons between death rates through 1998 and rates after 1998.

Other Measures of Impact and Burden

Mild TBI. More than 85% of TBIs in the United States are considered mild, and people with these injuries are more likely to seek care initially in emergency departments. National emergency department data indicate that African Americans have higher TBI incidence rates than whites and other race groups combined.³ African Americans also have a higher rate of nonfatal TBI hospitalizations compared to whites. Nonfatal TBI hospitalization data for other race and ethnic groups are statistically unreliable due to small numbers. Given the difference between national and Washington data for African Americans for mortality from TBI, we do not know whether these other national findings for African Americans apply to Washington.

Follow-up care. Several studies have found that African Americans are significantly less likely to receive appropriate follow-up after a TBI incident.⁴

For More Information

Department of Health Injury Prevention Program. Telephone: (360) 236-3616, Email: injury.data@doh.wa.gov

Traumatic Brain Injury Deaths Chapter, *2002 Health of Washington State*,
http://www.doh.wa.gov/HWS/doc/IV/IV_TBI.doc.

Data Sources (For additional detail, see Appendix B.)

State death data: Vital Registration System Annual Statistical Files, Washington State Deaths 1980-2002 CD-ROM issued November 2003.

Population data for race and ethnicity: U.S. Census for 1990; National Center for Health Statistics bridged race population counts for 2000, 2001 and 2002; Public Health – Seattle & King County intercensal interpolations for 1991 – 1999, EPE Unit, February 2003.

Population data for education and poverty: U.S. Census 2000 Summary File 3, Tables P37 and P87 available through American Fact Finder,
http://factfinder.census.gov/home/saff/main.html?_lang=en.
Downloaded December 2003.

Technical Notes

Mild TBI is defined as those injuries seen in an emergency department, and moderate TBI are those injuries to patients who were hospitalized because of the injury.

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² Sosin DM, Sneizek JE, Thurman DJ. Incidence of mild and moderate brain injury in the United States, 1991. *Brain Injury* 1996;10(1):47-54.

³ Jager TE, Weiss HB, Coben JH, Pepe PE. Traumatic brain injuries evaluated in US emergency departments, 1992 – 1994. *Acad Emerg Med* 2000;7:134-140.

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Suicide

Definition: Suicide includes all intentional, self-inflicted deaths. The applicable ICD9 codes are years 1980-1998 are E950-E959. For 1999 and later, the applicable ICD10 codes are X60-X84 and Y87.0.

Summary

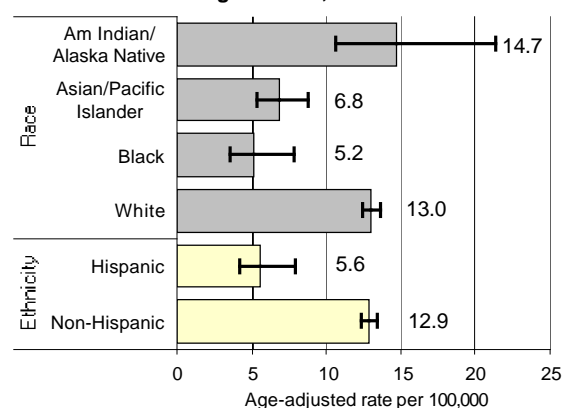
In Washington State and nationally, age-adjusted suicide rates are higher for whites, American Indians and Alaska Natives, and non-Hispanics compared to other race and ethnic groups. In Washington, suicide rates increase as poverty increases and as educational attainment decreases. Those with lower educational attainment and fewer economic resources may have less social support and may have more frequent stressful life events,¹ which could place them at higher risk for completing suicide. The interactions of race, ethnicity, poverty, and education for suicide have not been widely researched.

Rates

Race and Ethnicity

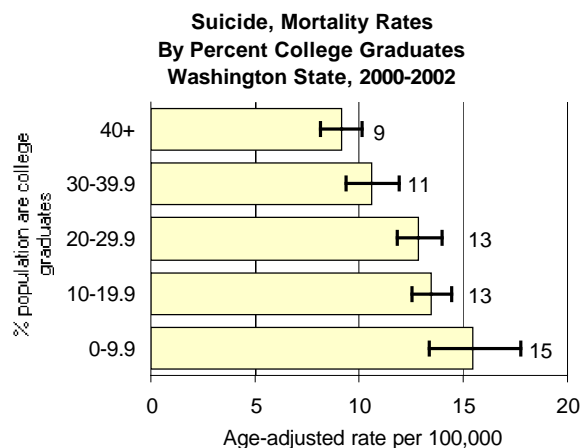
In Washington State for 2000 – 2002 combined, age-adjusted suicide rates were higher for whites and American Indians and Alaska Natives compared to other race groups. Non-Hispanics had higher suicide rates than Hispanics. The relatively low rate of suicides among African Americans is also seen nationally despite experiences of racial discrimination, a disproportionately high burden of poverty, and often living in areas that lack community resources. Possible explanations for this phenomenon include strong religious beliefs and social support.² (See Appendix A, Race and Hispanic Ethnicity.)

**Suicide, Mortality Rates
By Race and Ethnicity
Washington State, 2000-2002**



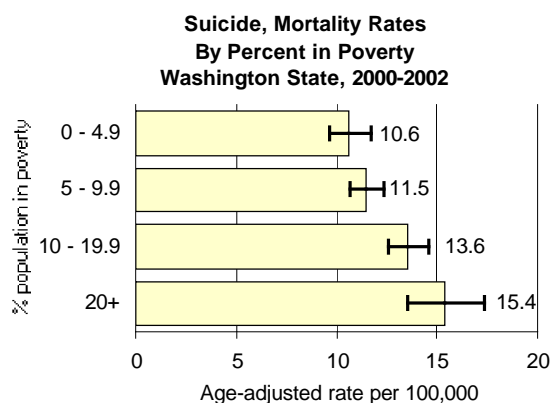
Education

To assess the association between education and suicide, we assigned an educational level to each person who died from suicide based on the percent of people age 25 and older with a college education in the census tract in which the person resided at death. (See Appendix A, Education.) In Washington for 2000 – 2002 combined, suicide rates increased as the proportion of people completing college decreased. This pattern is consistent with national data showing that, as educational attainment increases, suicide rates decrease.³ Those with lower educational attainment may have less social support and experience more negative interactions with their social network and more frequent stressful life events,¹ which could place them at higher risk for suicide.



Poverty

To study the link between poverty and suicide, we measured poverty as the percent of the population that lived at or below the federal poverty level in the census tract in which the person who died from suicide resided at death. (See Appendix A, Poverty.) In Washington for 2000 – 2002 combined, suicide rates increased as the proportion of people living in poverty increased. Nationally, people living in poverty have an increased risk of a broad spectrum of mental disorders⁴ and poorer access to health services compared to other people.⁵ Both of these factors can influence the rate of suicide. Additionally, people with fewer economic resources may also have less social support and may experience more negative interactions with their social network and more frequent stressful life events,¹ which could place them at higher risk for suicide.



Trends

State age-adjusted suicide rates have declined by 1% per year for whites, but they have remained stable for all other race and ethnic groups in Washington since 1990. (See Appendix A, Trend Analysis.)

For More Information

Department of Health Injury Prevention Program. Telephone: (360) 236-3616, Email: injury.data@doh.wa.gov

Suicide Chapter, 2002 *Health of Washington State*, http://www.doh.wa.gov/HWS/doc/IV/IV_SUI.doc.

Data Sources (For additional detail, see Appendix B.)

State death data: Vital Registration System Annual Statistical Files, Washington State Deaths 1980-2002 CD-ROM issued November 2003.

Population data for race and ethnicity: U.S. Census for 1990; National Center for Health Statistics bridged race population counts for 2000, 2001 and 2002; Public Health – Seattle & King County intercensal interpolations for 1991 – 1999, EPE Unit, February 2003.

Population data for education and poverty: U.S. Census 2000 Summary File 3, Tables P37 and P87 available through American Fact Finder, http://factfinder.census.gov/home/saff/main.html?_lang=en. Downloaded December 2003.

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- ¹ Mickelson KD, Kubzansky LD. Social distribution of social support: the mediating role of life events. *Am J Community Psychol*. 2003 Dec;32(3-4):265-81.
- ² Gibbs J. African-American suicide: a cultural paradox. *Suicide Life Threat Behav* 1997;27(1):68-79.
- ³ Kessler RC, Borges G, Walters EE. Prevalence of and risk factors for lifetime suicide attempts in the National Comorbidity Survey. *Arch Gen Psychiatry* 1999;56(7):617-626.
- ⁴ Miranda J, Green BL. The need for mental health services research focusing on poor young women. *J Ment Health Policy Econ*. 1999 Jun 1;2(2):73-80.
- ⁵ Adler NE, Boyce WT, Chesney MA, Folkman S, Syme SL. Socioeconomic inequalities in health: no easy solution. *JAMA* 1993;269:3140-3145.

Homicide

Definition: All deaths due to injuries inflicted by another person with intent to injure or kill, by any means. For years 1980 through 1998 the applicable underlying cause of death codes are ICD-9 codes E960-E969. For 1999 and later the applicable death codes are X85-Y09,Y87.1

Summary

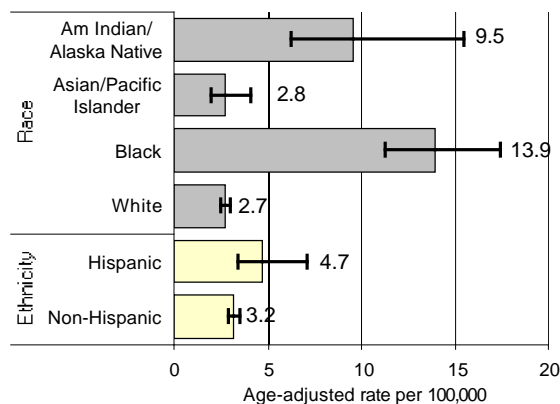
In Washington State and nationally, age-adjusted homicide rates for African Americans and American Indians and Alaska Natives are at least three times higher than rates for whites and Asian and Pacific Islanders. In Washington State and nationally, homicide rates among Hispanics are slightly higher than rates among non-Hispanics. Since 1990, homicide rates for African Americans in Washington have declined significantly, narrowing the gap between African Americans and people in other race groups. In Washington, homicide rates increase as poverty increases and as educational attainment decreases. A recent study suggests that neighborhood social and economic characteristics are a more important determinant of homicide rates than individual racial, social, and economic differences.¹ Additionally, several studies have shown that the higher homicide rate among African Americans either disappears or is greatly reduced after adjusting for social and economic factors.^{2,3}

Rates

Race and Ethnicity

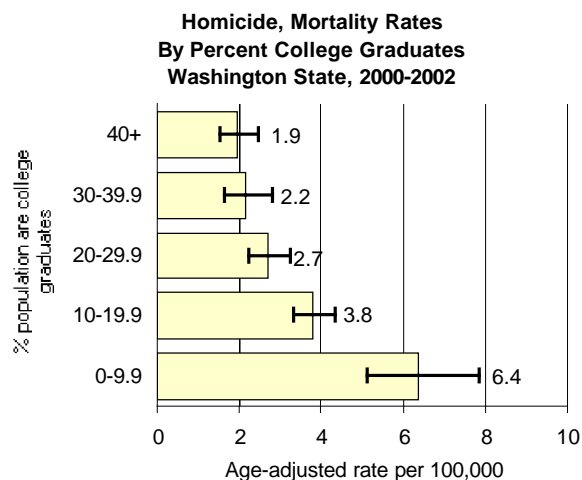
In Washington State for 2000 – 2002 combined, age-adjusted homicide rates were higher for African Americans and for American Indians and Alaska Natives compared to other race groups, and they were higher for Hispanics compared to non-Hispanics. This pattern is also seen nationally. (See Appendix A, Race and Hispanic Ethnicity.)

**Homicide, Mortality Rates
By Race and Ethnicity
Washington State, 2000-2002**



Education

To assess the association between education and homicide, we assigned an educational level to each person who died from homicide based on the percent of people age 25 and older with a college education in the census tract in which the homicide victim resided at death. (See Appendix A, Education.) In Washington for 2000 – 2002 combined, as the proportion of the population that completed college increased, Washington's age-adjusted rates of homicide decreased. People living in census tracts where the lowest proportion of the population completed college had a homicide rate that was three times higher than the rate of people living in tracts where the greatest proportion of the population completed college. This same pattern is observed nationally.



Poverty

To study the link between poverty and homicide, we measured the percent of the population that lived at or below the federal poverty level in the census tract in which the homicide victim resided at death. (See Appendix A, Poverty.) In Washington for 2000 – 2002 combined, people living in census tracts where the greatest proportion of the population lived in poverty had an age-adjusted homicide rate three times higher than people living in census tracts where the lowest proportion lived in poverty. Additionally, as the percent of people living in poverty increased, homicide rates in Washington also increased. This gradient is consistent with national data showing that as family income increases, the risk of death from homicide decreases.³

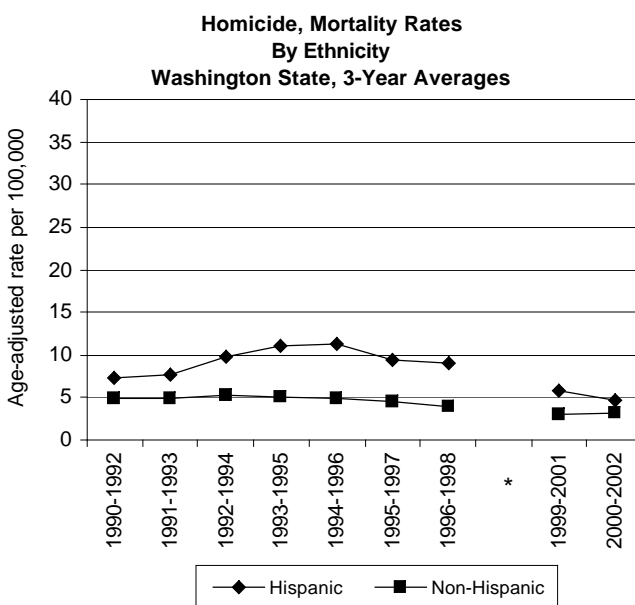
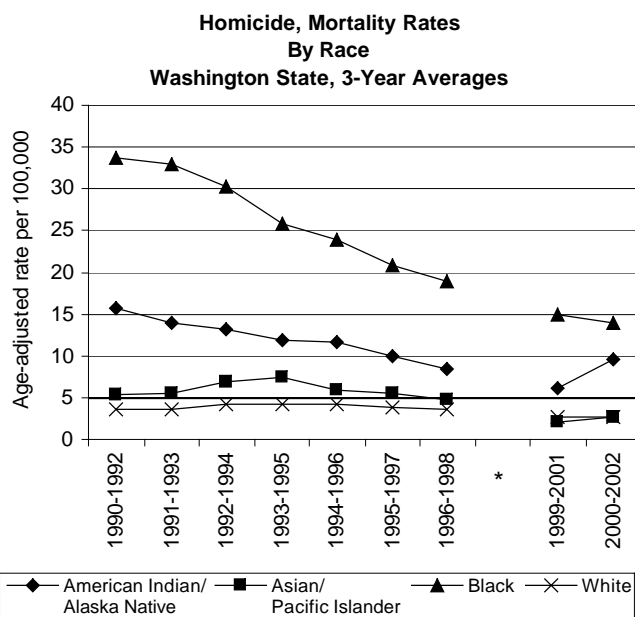


Race, Ethnicity, Poverty, and Education

Several studies have shown that the higher homicide rate among African Americans either disappears or is greatly reduced after adjusting for social and economic factors.^{2,3} The relationship between homicide rates and individual educational attainment or economic resources is complex, because it is difficult to separate individuals from the characteristics of the neighborhoods in which they reside. A recent study suggests that neighborhood conditions, including social and economic circumstances such as residential stability, family structure, and urbanization, are more important determinants of homicide than individual racial, educational, and economic differences.¹

Trends

Since 1990, age-adjusted homicide rates have significantly declined for all race groups except American Indians and Alaska Natives. (See Appendix A, Trend Analysis.) The declines have occurred at the rate of about 8% per year for African Americans, 7% per year for Asian and Pacific Islanders, and 4% for whites. The sharp decline for African Americans has decreased the disparity in homicide rates between this and other race and ethnic groups. Homicide rates for American Indian and Alaska Natives appear to have increased recently. Age-adjusted homicide rates have declined by about 5% per year for non-Hispanics. For Hispanics, homicide trends have changed over time, showing a peak from 1994 – 1996, and a decline since that time, resulting in a reduction of the disparity between Hispanic and non-Hispanic homicide rates.



For More Information

Department of Health Injury Prevention Program. Telephone: (360) 236-3616, Email: injury.data@doh.wa.gov

Homicide Chapter, 2002 *Health of Washington State*, http://www.doh.wa.gov/HWS/doc/IV/IV_HOM.doc.

Data Sources (For additional detail, see Appendix B.)

State death data: Vital Registration System Annual Statistical Files, Washington State Deaths 1980-2002 CD-ROM issued November 2003.

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Population data for education and poverty: U.S. Census 2000 Summary File 3, Tables P37 and P87 available through American Fact Finder, http://factfinder.census.gov/home/saff/main.html?_lang=en. Downloaded December 2003.

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Other Measures of Impact and Burden

Life expectancy of African Americans is shorter than that of whites. Higher rates of heart disease, cancer, and homicide are the largest contributors to this disparity.⁴

Adolescent Pregnancy and Childbearing

Summary

Adolescent pregnancy is a complex issue influenced by many factors including individual, family, and community characteristics. Its consequences negatively affect the health, social, and economic well-being of the youth involved and society as a whole.

In 2002 in Washington State, the adolescent pregnancy rate among 15 – 17 year-olds was 31 per 1,000, the lowest rate in more than 20 years and well within the *Healthy People 2010* goal of a rate no higher than 43/1,000. While declining rates of adolescent pregnancy generate cautious optimism, rates in many developed countries are significantly lower than those in Washington.¹

No single approach for preventing adolescent pregnancies is appropriate for all adolescents in all circumstances. Some approaches, such as youth development programs, show promise in reducing pregnancy rates. Other approaches, such as abstinence-only programs, require further evaluation. Coordinated and sustained interventions from all sectors of society are needed to ensure that the trend of declining adolescent pregnancy rates continues.

Background Note

The primary sources of data for adolescent pregnancy are birth certificate data, fetal death certificate data and abortion data from the Washington State Department of Health Center for Health Statistics. Where possible, in the following sections we provide characteristics of all teen pregnancies. In most instances, though, we have provided data only on live births due to the unavailability of data on all pregnancies.

Definition: In this section, “adolescents” or “teens” are 15-17 year olds unless otherwise indicated. Analysis was restricted to 15-17 year olds because they are school age. Pregnancy among teens younger than 15 is a rare event and teens older than 17 are at lower risk for poor birth outcomes. Adolescent pregnancies are estimated by adding together reported births, induced abortions, and fetal losses for females age 15-17. Spontaneous abortions (miscarriages) occurring prior to 20 weeks gestation are not included because there is no way of accurately estimating their number.

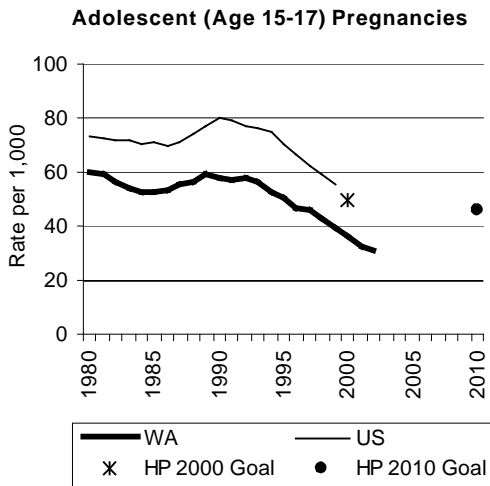
Time Trends

Adolescent pregnancies. The rate of pregnancy among 15 – 17 year-olds in Washington decreased during the early 1980s to a low of 53/1,000 in 1984 and then increased to 59/1,000 in 1989. Since then, the rate has declined steadily to 31/1,000 in 2002, which is the lowest rate since before 1980. For every year from 1980 to 1999, the pregnancy rate among 15 – 17 year-olds in Washington was well below the national average, which has also been decreasing since the early 1990s.

Adolescent births. Washington’s birth rate for 15 – 17 year-olds began rising steadily after 1986 and peaked in 1992 at 33/1,000. After 1992, the rate decreased. In 2002, the birth rate for 15 – 17 year-olds was 17/1,000, the lowest rate since before 1980. National studies suggest that adolescent birth and pregnancy rates might be declining, because fewer teenagers are having sex and those who do engage in sexual activity are more effective users of contraception.^{2,3}

Adolescent abortion. Washington’s abortion rate for 15 – 17 year-olds steadily decreased from 30/1,000 in 1989 to 14/1,000 in 2002.

(See Appendix A, Trend Analysis.)

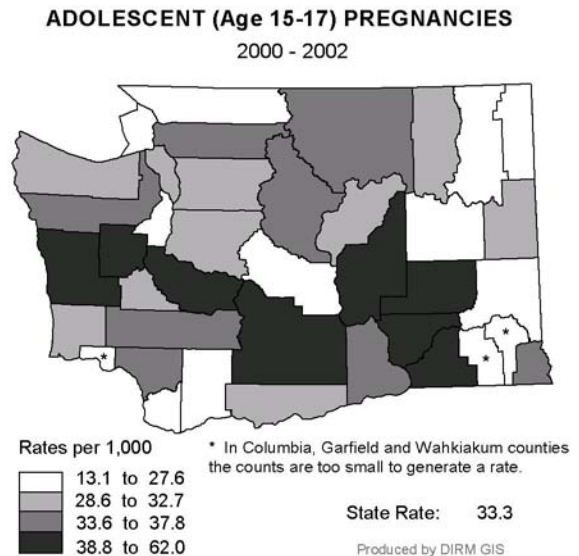


Year 2010 Goal

The *Healthy People 2010* goal for adolescent pregnancies was no more than 43/1,000. Washington has already achieved this national goal.

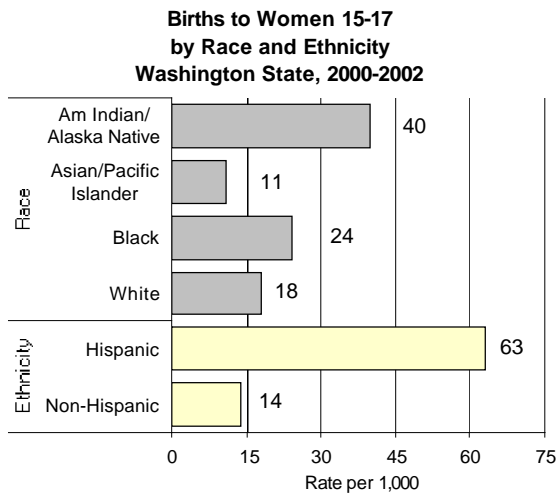
Geographic Variation

For 2000 – 2002 combined, teen pregnancy rates at the county level varied from a high of 62/1,000 in Franklin and Yakima counties to a low of 13/1,000 in Whitman county. The comparable state rate was 33/1,000. The counties with the highest average teen pregnancy rates were Adams, Franklin, Grays Harbor, Grant, Mason, Pierce, Walla Walla, and Yakima. The lowest rates were in Clark, Kitsap, Kittitas, Lincoln, Pend Oreille, San Juan, Skamania, Stevens, Whatcom, and Whitman counties.



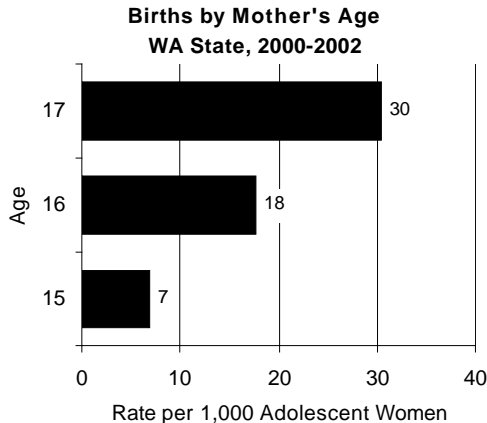
Race and Ethnicity

It is not possible to calculate statewide adolescent pregnancy rates by race and ethnicity because the Washington State Induced Abortion Data System is frequently missing race information. Therefore, this section focuses on live births. In Washington for 2000 – 2002 combined, live births to women 15 – 17 years old were higher among American Indians/Alaska Natives and African Americans and lower among Asians and Pacific Islanders compared to whites. This pattern is also seen nationally. Rates in both Washington and for the nation as a whole were higher among Hispanics compared to non-Hispanics. Birth rates for African American adolescents were lower in Washington than nationally, while birth rates for American Indian and Alaska Native and for Hispanic adolescents were higher than national rates.³ Birth rates for teenagers of all races and ethnic groups have declined significantly since 1992. Similar to national trends, declines for African American teens are especially noteworthy. In Washington, the birth rate per 1,000 African American 15 – 17 year-olds has fallen by more than 60% since the early 1990s. It is not clear why rates in this group have declined more rapidly than rates among adolescents of other races. (See Appendix A, Race and Hispanic Ethnicity.)



Age

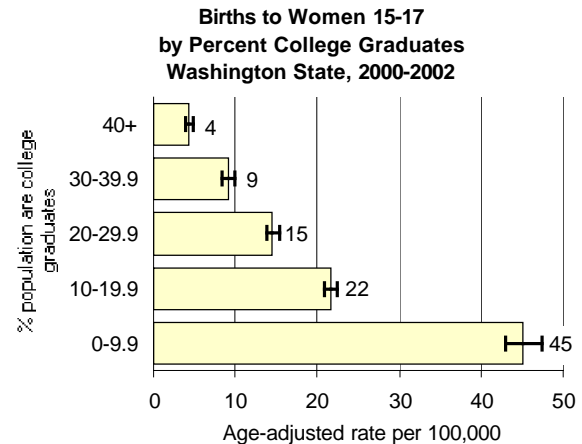
During 2000 – 2002, adolescent birth rates for 15 – 17 year-olds rapidly increased with maternal age. The highest birth rate was seen among 17 year-olds, at 30 births per 1,000 adolescents. All three age groups have experienced similar declines since birth rates peaked in the early 1990s.



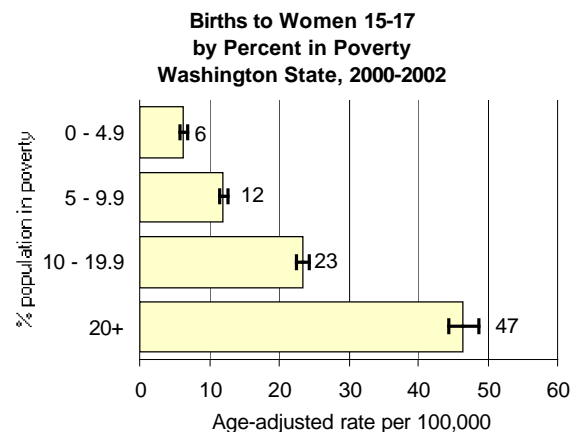
Education and Income

To assess the association between education and adolescent birth rates, we assigned an educational level to each birth based on the percent of people age 25 and older with a college education in the census tract in which the mother resided at delivery. (See Appendix A, Education.) We used this method to be consistent with the *2004 Supplement* to the Health of Washington State. During 2000 –

2002 combined, adolescent birth rates in Washington were higher in census tracts where a smaller proportion of the population completed college.



To study the association between poverty and adolescent birth rates, we measured poverty as the percent of the population living at or below the federal poverty level in the census tract in which the mother resided at the time of delivery. (See Appendix A, Poverty.) Adolescent birth rates were higher in census tracts with a higher proportion of people living at or below the poverty level. Research from California shows that the proportion of families living below the poverty level within a zip code was highly correlated to birth rates among teenagers in that zip code, even after adjustment for related community-level factors such as employment, education, race, and ethnicity.⁴



Other Measures of Impact and Burden

Educational and economic effects of teen parenting. Research suggests that early parenthood is a challenge to teens trying to complete their high school education. In the United States, parenthood is a leading reason girls do not finish high school.⁵ Nationally, less than one-third of teens who give birth before age 18 ever completed high school.⁶

Teenage childbearing leads to adverse economic consequences. Studies have indicated that not completing high school is more likely to result in welfare dependence and low earnings.⁷ Teen mothers are more likely to have repeat pregnancies and to spend more of their adult years as a single parent than women who delay childbearing.^{6,8} As a result, more children must be supported on a limited income.

Adult fathers of children born to adolescent mothers. Fathers involved in teen births frequently are not teenagers themselves. Data from the 1995 National Survey of Family Growth showed about 29% of sexually active female teens ages 15 – 17 had partners three to five years older, and 7% had partners six or more years older.⁹ These data raise the issue of teen-adult sexual activity, as well as important legal, economic, and public health issues that require further investigation.

Cost of teen births. According to Washington's First Steps database, Medicaid financed nearly 89% of the 6,961 births to 15 – 17 year-olds during 2000 – 2002.¹⁰ In 2002, the mean cost for prenatal care and delivery was \$6,902 per woman for all Medicaid-covered deliveries.¹¹ This figure may differ when limited to teen deliveries.

Outcomes for teen births. Teen childbearing can result in several adverse outcomes for both the mother and her children. Current research is unclear about the extent to which the age of the adolescent mother versus pre-pregnancy behaviors and risk contribute to poor childbearing outcomes.⁷ Among 15 – 17 year-olds who delivered in Washington during 2000 – 2002, 36% did not receive prenatal care during their first trimester.

Similar to national data, Washington's reported rates of smoking during pregnancy are highest for teens. During 2000 – 2002, 22% of 15 – 17 year-olds who became pregnant reported smoking during pregnancy. Smoking during pregnancy is associated with intrauterine growth restriction, low birthweight, and infant mortality.

Children of teen mothers are more likely to be born prematurely and with low birthweight than children born to women who delay childbearing beyond their teen years.⁶ Low birthweight increases the likelihood of infant mortality, blindness, deafness, respiratory difficulties, mental illness, retardation, and cerebral palsy.⁶ The chances of being later diagnosed with dyslexia and hyperactivity are more than doubled among low birthweight infants.⁶

Children of teen parents are more likely to repeat a grade and less likely to complete high school than children born to older mothers. Sons of teen parents are 13% more likely to enter prison and daughters of teen mothers are 22% more likely to become teen mothers themselves.⁶

Risk and Protective Factors

National research studies among 15 – 19 year-olds are used here to identify common risk factors and protective mechanisms that affect adolescent pregnancy rates. These can be viewed from the individual, family, and community level.

Individual factors. The likelihood of an adolescent becoming pregnant increases with early alcohol and drug use, early sexual activity, early challenging behaviors in kindergarten through third grade, and physical or sexual abuse.¹² Low expectations for the future also place adolescents at risk for pregnancy.¹³

Delaying sexual activity and limiting alcohol and drug use as well as developing good communication skills have been identified as effective strategies for reducing adolescent pregnancies.¹²

Family factors. An adolescent's family plays an important role in determining risk for adolescent pregnancy. Frequent conflict in the family, illness or addiction of a parent, and lack of parental supervision are significant risk factors for adolescent pregnancy.¹² Adolescent childbearing has been statistically associated with low levels of education in the family and with family experience of adolescent pregnancy by a parent or a sibling.¹³

Open and positive communication and strong family attachments have been identified as vital protective factors for adolescents. Providing youth with clear rules and boundaries and opportunities for involvement in family activities and duties are also important protective mechanisms.^{12,14}

Community factors. Teens living in communities with high poverty, crime, unemployment, divorce, and adolescent birth rates and low educational levels appear to be at risk for adolescent pregnancy.¹³ A feeling of connection to adults in the community, strong school connections, availability of schools providing support and respect to youth, and constructive after-school activities and organizations such as clubs and youth centers act as protective factors for preventing adolescent pregnancy.^{12,14,15}

High Risk Populations

Adolescents who give birth. Many adolescents who give birth undergo another pregnancy within two years. During 2000 – 2002, 17% of births to adolescents ages 15 – 17 in Washington were repeat pregnancies. Adolescents at high risk for repeat pregnancies might not use contraceptives consistently after the birth of their first child.¹⁶ A positive attitude about adolescent pregnancy and ambivalence about postponing further childbearing beyond adolescence are associated with repeat pregnancies.¹⁶

Adolescents experiencing difficult life situations. Research suggests that the likelihood of pregnancy increases with adolescents facing difficult life situations. In a recent review of at least 250 studies, the National Campaign to Prevent Teen Pregnancy (NCPTP) identified more than 100 factors associated with teen sexual activity, pregnancy, and childbearing.¹⁷ These factors fall under categories such as economically disadvantaged families and communities; “risky” characteristics of teens, family, and peers; and partner attitudes and beliefs that support adolescent pregnancy.

Intervention Strategies

Adolescent pregnancy is a complex problem influenced by a multitude of factors. Because the reasons leading to adolescent pregnancy vary, no single approach can be expected to reduce it. Effective approaches are more likely to focus on several identified antecedents to adolescent pregnancy.¹⁷ The following approaches to prevention are supported in the scientific literature.

Support abstinence as the safest choice for teens and promote correct and consistent use of contraceptives for sexually active teens. The NCPTP study emphasized that the above approach neither increases sexual activity nor decreases contraceptive use.¹⁷ While the few rigorous evaluations of abstinence-only curricula completed to date do not show any overall effect on sexual behavior or contraceptive use,¹⁷ when followed, abstinence is the safest choice to prevent pregnancy in adolescents. Further evaluation is required before using an abstinence-only approach in adolescent pregnancy prevention programs.

Of all teen pregnancies, 83% are unplanned.¹⁸ A lack of individual commitment to specific pregnancy prevention methods (i.e., abstinence and different contraceptive methods), ambivalence about childbearing, and confusion about prevention appears to result in the high rates of unintended pregnancy rates among adolescents.⁶ Promoting correct and consistent use of contraceptives for sexually active teens can lead to reduction in unplanned pregnancy rates.¹⁸

From 1998 – 2003, Washington State funded and evaluated community-based abstinence education programs, while collecting information on best practices from other states. Findings indicate that a public awareness campaign along with community-based programs can be more effective in initiating positive behavior change than either of these activities alone.

Currently, the Washington State Department of Health is developing a statewide public awareness campaign targeting youth ages 10 – 14 and parents of young teens. The Department will also implement community-based projects that include a media literacy component. These programs intend to create messages that foster parent-child communication, promote healthy relationships, and provide youth

with better decision-making skills to make informed choices around abstinence.

Help young people develop their skills and abilities. Interventions addressing skills and competencies of adolescents can help increase their motivation to avoid pregnancy, childbearing, and other high-risk behaviors. Examples of these interventions include youth development programs, which assume that adolescents must develop basic competencies and skills to become successful adults. These basic skills and competencies for adolescents include a sense of belonging, self-awareness, self-worth, and a sense of mastery and competence.⁷ Evaluations of youth development programs show varied results in reducing adolescent pregnancy rates. Youth development programs such as vocational education programs do not appear to have any impact on pregnancy or birth rates.¹⁷ Service-learning programs, though, can reduce adolescent pregnancy rates while youth participate in the program.¹⁷ While some youth development programs appear to show promise in reducing adolescent pregnancy rates, further evaluation is required to determine the most effective approach.

Washington State has funded several teen pregnancy prevention projects since 1991 that employed a comprehensive approach toward pregnancy prevention. The state has adopted a multi-tiered approach that matches services provided to adolescents' risk of sexual behavior and pregnancy. Adolescents at higher risk for pregnancy receive more service hours and more intensive services than those at lower risk. Although more rigorous evaluation is necessary, results from preliminary evaluation show a reduction in risk-taking behaviors when comparing adolescents before and after program participation.

Currently, the Department of Health is implementing teen pregnancy prevention projects that include community-based interventions with a family planning component. The family planning component includes providing information on both abstinence and contraceptive use to high-risk youth.

See related Chapters on Unintended Pregnancy, Low Birth Weight, Prenatal Care, Infant Mortality, Tobacco Use, Alcohol and Drug Disorders, Sexual Behavior, and Nutrition in *The Health of Washington State, 2002 edition.*

Data Sources (For additional detail, see Appendix B.)

Washington State adolescent pregnancy data: Pregnancy and Induced Abortions 2002. Center for Health Statistics, Washington State Department of Health.

Washington State birth data: Washington State Department of Health, Center for Health Statistics, Washington State Births, 1990-2002 CD-ROM released November 2003.

Population data for race and ethnicity: U.S. Census for 1990; National Center for Health Statistics bridged race population counts for 2000, 2001 and 2002; Public Health – Seattle & King County intercensal interpolations for 1991 – 1999, EPE Unit, February 2003.

Population data for education and poverty: U.S. Census 2000 Summary File 3, Tables P37 and P87 available through American Fact Finder http://factfinder.census.gov/home/saff/main.html?_lang=en. Downloaded December 2003.

For More Information

Washington State Department of Health, Division of Community and Family Health, Office of Maternal and Child Health, Child and Adolescent Health Section at (360) 236-3515.

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Children with Special Health Care Needs

Definition: Children with special health care needs are those who have or are at increased risk for chronic physical, developmental, behavioral or emotional conditions and who require health and related services of a type or amount beyond that required by children generally. (Maternal and Child Health Bureau MCHB)

Summary

According to the National Survey of Children with Special Health Care Needs, about 14% (approximately 211,000 children) in Washington State ages 17 and younger have special health care needs. Significantly higher prevalence rates for special health care needs occur among males than females, school-age children compared to those younger than 5 years, whites compared to Asians, and non-Hispanic compared to Hispanic children.

Early diagnosis and access to a variety of medical, community, social, and school services can minimize the effects of chronic and disabling conditions on the growth and development of children with special needs. Receiving services in a “medical home” is important to ensuring the best health outcomes for all children. Because of their extensive use of services, children with special health care needs might be a sentinel population for measuring the impact of social and health system changes.

Background Note

Children with special health care needs may have ongoing health and developmental problems such as cancer, asthma, mental retardation, or attention deficit hyperactivity disorder (ADHD) that affect their physical, cognitive, or mental health. Despite the variation in their diagnoses, many of these children have similar health and educational service needs. As a result, it is useful to consider their circumstances as a group rather than by specific clinical diagnostic categories.¹

Rates

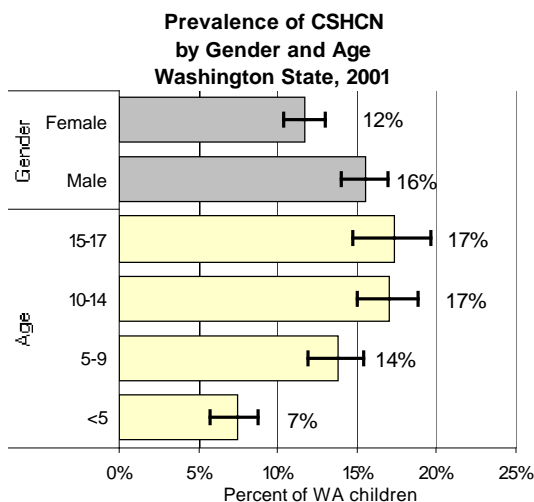
Estimates of prevalence of children with special health care needs vary depending on the methods used to identify them. Approaches range from evaluating clinical diagnoses using medical records to asking parents to select from a list of medical diagnoses to questionnaires focused on the consequences of a child having a chronic condition.² For example, the National Survey of Children with Special Health Care Needs (CSHCN) used the CSHCN Screener, a short parent questionnaire that identifies children with special needs based on the consequences of their conditions.³ Conducted from 2000 to 2002 by the National Center for Health Statistics, this survey generated both state and national estimates of prevalence for households and the total pediatric population. In Washington State, according to this survey, about 14% of children ages 17 and younger (approximately 211,000 children) were identified as having special health care needs. In the 1994 – 1995 National Health Interview Survey Disability Supplement, a broader consequences-based definition identified 17% of Washington children younger than 19 years old as having a special health care need. (See Appendix B, Data Sources and Technical Notes for more detail on these surveys.) A 1993 study conducted by the Washington State Health Care Policy Board generated a similar prevalence rate (18%) based on analysis of clinical diagnoses in 1997 medical encounter data. This study estimated prevalence by severity of chronic condition as follows: about 11% of children had mild conditions, such as asthma or ADHD, which require limited services; about 6% had moderate conditions, such as cleft lip/palate or diabetes; and only 1% of children had conditions of high severity, such as leukemia or chronic ventilator dependency, which require frequent and intensive services.⁴

Healthy People 2010 Goals

The *Healthy People 2010* (Appendix B) goals for children with special health care needs include: (1) increasing the proportion of children with special health care needs who have access to a medical home where continuous cost-effective care is provided by a trusted physician and (2) increasing the proportion of territories and states that have service systems for children with or at risk of chronic and disabling conditions. (See Appendix B, Data Sources and Technical Notes for information on “medical home.”)

Age and Gender

According to the National Survey of CSHCN, Washington children younger than five years had a lower prevalence of special health care needs than school-age children. This finding may result in part because many needs—such as ADHD and asthma, the two most prevalent pediatric chronic health conditions—may not be identified until children enter school. Males are also more likely to have a special health care need than females. These Washington prevalence patterns mirror those of the United States as a whole.

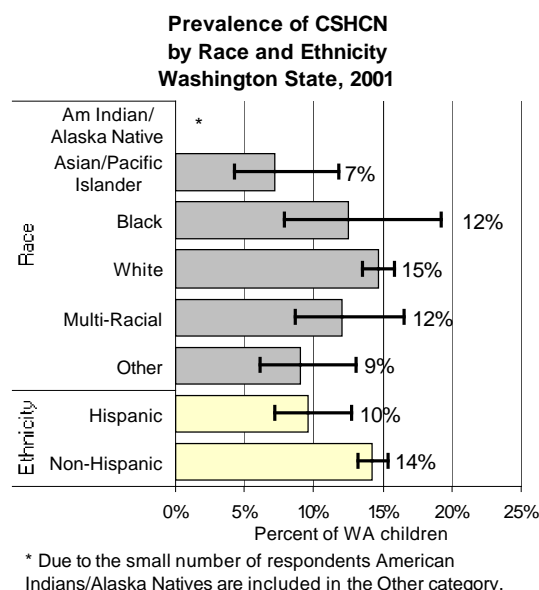


Race and Ethnicity

Estimates from the National Survey of CSHCN on race and ethnicity indicate that non-Hispanic children are more likely to have a special health

care need than Hispanic children, with rates of 14% compared to 10%, respectively. Asian children (7%) are significantly less likely to be identified as children with special health care needs than white children (15%). Differences between prevalence rates for other racial groups are not statistically significant.

In a study that analyzed national data from 1979 – 2000, African American children had higher rates of disability than white children, a difference attributed to differences in poverty status.⁵



Income and Education

Data from the National Survey of CSHCN indicate that about 30% of children with special health care needs in Washington State live in families with incomes less than 200% of the federal poverty level. National data show that children living at or below poverty have an increased prevalence of special health care needs. These data have not been adjusted for other risk factors, however. Results from the 1994 National Health Interview Survey Disability Supplement suggest that children whose parents have a high school education or less have an increased prevalence of special health care needs compared to those whose parents had some college education.⁶

Other Measures of Impact and Burden

Use of care. Children with special health care needs use health services more intensively than the general population. These services include outpatient physician contacts, hospitalizations, and emergency services.^{7,8} In previous studies, children with special health care needs nationally had more than twice as many physician contacts and five times as many hospital days as other children.⁴ The National Survey of CSHCN showed that, in Washington in 2001, prescription medications, dental care, and routine medical care were the services most needed by children with special health care needs. Of children with special needs, 52% needed to see a specialist, and about 28% needed mental health care in the 12 months prior to the survey.

Cost of care. The 1993 Health Care Policy Board study found that 17% of children had special health care needs in Washington, as identified through medical encounter records, and these children accounted for 60% of the medical costs for all children at that time. Children with chronic conditions have medical costs about six times those of children without chronic conditions. Costs also increase with the severity of conditions.⁹

The National Survey of CSHCN found that about a third of families with children with special needs spent less than \$250 during the past 12 months for their child's medical care. But 22% spent more than \$500. Families with children with special needs who have functional limitations spend disproportionately more for their child's care than do those with children who are dependent on medications or services.

Impact on families. Families provide most of the care for their children with special health care needs. Secondary health conditions, such as depression, psychological distress, and declines in physical health are more common among parents and siblings of children with special health care needs. These conditions result from factors such as the increased financial strain, uncertainty about the future, social isolation, and

fatigue often associated with meeting the children's care needs.¹⁰

According to the National Survey of CSHCN, 21% of families with children with special needs in Washington State experienced financial problems due to the child's condition in 2001. This percentage mirrors the national average of 21%. In addition, 27% of children with special needs have families who experienced some type of change in their employment due to the child's condition. This change included both reducing work hours and stopping work entirely. Seventeen percent of Washington families with a child with special needs spent more than 11 hours per week providing, arranging, or coordinating care for their child.

Secondary health conditions and other outcomes. Children with special health care needs may experience secondary health conditions associated with their primary diagnosis, including decubitus ulcers, obesity, contractures, respiratory insufficiency, and depression. These children may also be at increased risk for child abuse and neglect, due in part to the characteristics of their conditions, the psychological and social impacts on families, and their dependency on others for both social interaction and basic needs.

As they transition into adulthood, children with special needs may have difficulty finding a health care provider who is able to provide services to them. According to the National Survey of CSHCN, only 10% of Washington families of youths (ages 13 – 17 years) with special needs receive the services necessary to make transitions to adult life. Although many of these children will be able to live and work independently as adults, others will be unemployed, socially isolated, or unable to live independently.¹¹

Child care and school system impacts. Families of children with special health care needs face several constraints when seeking child care, including facilities' reluctance to enroll children with special needs, insufficient or inadequately trained staff, difficulty adapting physical facilities, and high costs.¹² When children with special needs start school, the need for full-time child care may be replaced by a need for before- and after-school programs. While in school, children with special needs, their families, and schools face additional challenges.

Children in special education programs are eligible for educational services from ages 3 to 21, including nursing care, physical therapy, speech therapy, occupational therapy, and special education. According to the National Survey of CSHCN, about 32% of Washington's children with special needs in this age group were enrolled in special education programs, including more than half of children with special needs identified as having functional limitations. Data from a 1997 survey of school nurses in Washington showed that all school districts in the state serve at least one child with a chronic illness.¹³ Nationally, children with special health care needs experience three times as many school absences as other children.⁷ These absences affect the child's educational progress and may also interrupt school-based therapies and services that promote the child's overall well being.

Access Barriers

Thousands of diagnoses can be included in the definition of children with special health care needs, each with a unique set of risk and protective factors. Risk factors for inadequate care and barriers to access are common among all children with special health care needs.

Early identification. Some conditions are rare and not easily identifiable, while others do not become apparent until later in a child's development. Lack of awareness among families and health care providers and lack of access to screening and services also may delay diagnosis.

Complex systems of care. Care can be delayed or services denied because of overlapping or inconsistent eligibility criteria and policies regarding service provision. The complexity of the care system in Washington results in gaps and duplications in services and confusion for families and providers who are trying to understand and work within the various systems.

Community and system capacity. In Washington, specialized health services are more available in large urban settings with tertiary care hospitals. A significant number of children with special needs live far from these settings, however. The distances create travel and time hardships for families and make

coordination between community providers and specialty care providers difficult. Many children with special health needs are served in managed care plans, some of which may have limited experience meeting the health care needs of these children.¹⁴

Low income. Accessing health care is more difficult for families with low incomes. Among other issues, these families face problems with transportation, difficulty maintaining continuity of providers, and the unwillingness of providers to include in their practice clients who are uninsured or enrolled in Medicaid.¹⁵ In the 2002 Washington State Medicaid Client Satisfaction Survey, families with children with special needs were statistically more likely to report problems getting care, medications, occupational, physical or speech therapy, and referral to a specialist than families without children with special needs.¹⁶

Uninsured/underinsured. In Washington State, about 5% of children with special health care needs have no health insurance coverage. Even with insurance, many children are likely to lack coverage for some of the services needed to manage their condition. Lack of insurance or underinsurance results in increased financial burden to families and postponed or omitted treatment.¹⁷ Uninsured children with special health care needs are less likely to have a usual source of care or to have had a physician contact in the past year, and they are more likely to report unmet health care needs.¹⁸

Intervention Strategies

Public health interventions for children with special health care needs focus on the core public health function of assuring access to quality care. Historically, public health has paid for or provided some services directly. As Medicaid eligibility expanded to 200% of the federal poverty level in Washington and many other states, and as the State Child Health Insurance Program (SCHIP) was implemented, the public health focus in Washington State shifted to promoting medical homes and integrating services and service delivery systems for children with special health needs. This focus has helped move Washington toward achieving the *Healthy People 2010* Goals and National Performance Measures for children with special needs.

State and community-level assessment. To assure the availability of appropriate services, population-based data are needed on the number, geographic location, diagnoses, health and functional status, service needs, and impacts on families of children with special health care needs.¹⁹ The National Survey of CSHCN, which includes both national and state-specific data, provides initial estimates for many of the desired indicators, but it offers no data on variations within states. Additional county-level data, including records from many different state agencies serving children with special needs in Washington, are being developed to provide assessment data for communities across the state.

Assurance of services. State and local maternal and child health programs participate with other partners to develop systems of care for children with special needs. These partnerships are essential for broad-reaching and sustainable service delivery. Approaches to system development include:

- Training health care providers.
- Developing care guidelines.
- Promoting and paying for parent consultation in program planning and health policy development.
- Partnering with other state and community agencies to identify and address access barriers.

For example, through the Medical Home Leadership Network in Washington, more than 700 primary care providers have received information on community resources, health system changes, and effective office practices for children with special health care needs.²⁰ From 1999 – 2001, more than 500 public health and school nurses received information and materials through the Children's Hospital and Regional Medical Center's Health Consultation Program.²¹ Providers who participated in these programs reported increased knowledge of community resources and improved skills to provide care to children with special health care needs. Families provide leadership and consultation to the federally funded Washington Integrated Services Enhancement (WISE) Grant

on ways to improve the system of care for children with special health care needs.²²

Responding to policy changes. As the health service delivery system in Washington continues to evolve, children with special health care needs might be disproportionately affected because of their increased need for and use of services. Health care costs, changes in managed care plan participation, and provider and clinic availability will all affect health care access for this population. Children with special health needs might be affected by system changes long before the general population of children.

Collaboration among state and community agencies can result in policies that meet the needs of children with special health care needs. For example, in 2000 and 2002, the Washington State Department of Health collaborated with the Department of Social and Health Services Medical Assistance Administration (the state's Medicaid agency) to measure patient satisfaction among families of children with special health care needs through the agency's annual Consumer Assessment of Health Plan Survey (CAHPS). The Departments worked together to review findings, and they will share information with health plans to identify areas for improvement.

Data Sources and Technical Notes

The National Survey of CSHCN is a nationwide household survey conducted by the federal Maternal and Child Health Bureau and the National Center for Health Statistics from 2000 to 2002 to assess the prevalence and impact of special health care needs among children in all 50 states and the District of Columbia. Children were identified using the five-question CSHCN Screener. This survey explored the extent to which children with special health care needs have medical homes, adequate health insurance, and access to needed services. Other topics include care coordination and satisfaction with care. In each state, more than 3,000 households with children were screened to identify 750 children with special needs in that state. The data can be accessed at <http://www.cdc.gov/nchs/slits.htm>.

The National Health Interview Survey is a continuing nationwide household survey conducted by the U.S. Census Bureau and the National Center for Health Statistics. During 1994-95, the Disability Supplement was added to collect data on diagnostic conditions, functional status, and service needs of people with disabilities (including children). Additional information on the survey at <http://www.cdc.gov/nchs/products/catalogs/subject/nhis/diswrit.htm>.

Medical home: According to the American Academy of Pediatrics, a medical home is: "An approach to providing health care services in a high-quality and cost-effective manner. Care is received from a pediatric health care profession whom the family trusts. Care is accessible, family-centered, continuous, comprehensive, coordinated,

compassionate, and culturally effective. More information:
<http://www.aap.org/advocacy/medhome/resourcesmaterials.htm>.

For More Information

Washington State Department of Health, Division of Community and Family Health, Children with Special Health Care Needs Program, (360) 236-3571.

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Appendix A: Technical Notes

These notes describe how important terms used in this report were defined and measured. Topics are listed alphabetically, using major headings from the report or common statistical terms.

Confidence Intervals

Education (Added for the *2004 Supplement*)

Geographic Variation

Healthy People 2000 and 2010

Intervention Strategies

Poverty (Added for the *2004 Supplement*)

Race and Hispanic Ethnicity (Updated for the *2004 Supplement*)

Rates

Small Numbers

Trend Analysis (Updated for the *2004 Supplement*)

Urban and Rural

Confidence Intervals

Confidence intervals are used to account for the difference between a sample from a population and the population itself. They can also be used to account for uncertainty that arises from natural variation inherent in the world around us. As such, they provide a means of assessing and reporting the precision of a point estimate, such as a mortality or hospitalization rate or the frequency of reported behaviors. Confidence intervals do not account for several other sources of uncertainty, including missing or incomplete data, bias resulting from non-response to a survey, or poor data collection. In this report, we have used confidence levels of 95%. This level means that in 95 out of 100 cases, the confidence interval contains the true value.

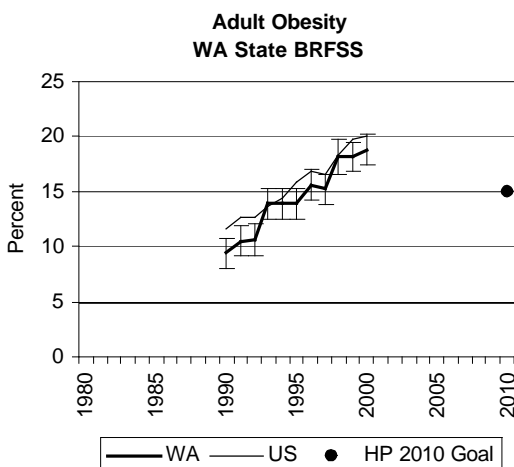
This report gives confidence intervals for all survey data, such as data from the Behavioral Risk Factor Surveillance System (BRFSS), the Pregnancy Risk Assessment Monitoring System (PRAMS), and adolescent health surveys. These confidence intervals were generally calculated by

multiplying the standard error by 1.96. Because of the nature of the sampling for BRFSS, PRAMS, and adolescent health surveys, standard errors for rates or frequencies using these data sources were generated using SUDAAN or STATA, software packages that account for complex sampling designs.

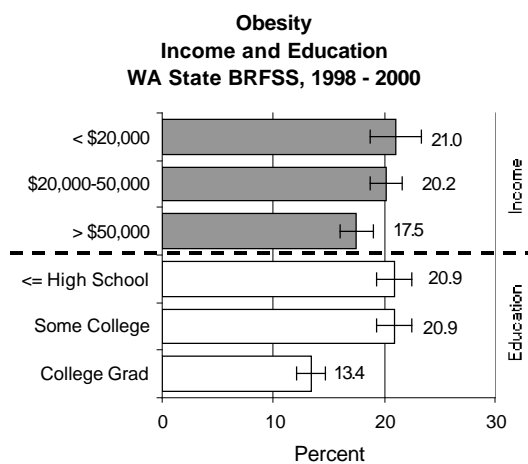
When data do not come from surveys but from other sources, such as birth and death records, including confidence intervals was left to the author's discretion. Because confidence intervals around estimates developed from these sources account for natural variation, authors were encouraged to use confidence intervals in instances where rates were subject to large annual or other fluctuation. Methods used to calculate these confidence intervals are consistent with the *Guidelines for Using Confidence Intervals for Public Health Assessment*, <http://www.doh.wa.gov/Data/Guidelines/ConfIntguide.htm>.

Confidence intervals are presented in narrative form, generally as a "plus or minus." For example, in the "Obesity and Overweight" chapter there is a statement that in 2000, 18.8% ($\pm 1.4\%$) of Washington residents were obese. The 1.4 was calculated by multiplying the standard error by 1.96. It can be both added to and subtracted from the observed data point (18.8) to get the 95% confidence interval of 17.4% to 20.2%.

Confidence intervals in this publication are also presented graphically, as in the time trend chart, which follows, showing obesity prevalence from 1990 through 2000. The confidence intervals are shown by the vertical lines, with the upper and lower limits shown by horizontal lines at each end of the intervals.



Confidence intervals in this publication are also presented in some of the horizontal bar graphs, as in the example below showing obesity by income and education.



While not equivalent to a formal test of statistical significance, rates are significantly different if the confidence intervals do not overlap. Thus, in the example presented above, college graduates have a statistically significantly lower rate of obesity than those with less education. Most often rates are not statistically significantly different when the confidence intervals overlap, but this is not always true. In the example given above where the confidence interval for people with incomes over \$50,000 per year overlaps slightly with the confidence intervals for those with lower incomes, one would need to do a formal test of statistical significance to determine whether there are statistically significant differences in obesity for those in the highest income level compared to

those at lower levels. In this example, a formal test shows statistically significant differences between those in the highest income group compared to those in the lower income groups. In contrast, the extent of the overlap in confidence intervals for the middle and lowest income group is such that we can conclude that the differences between these estimates are not statistically significant without doing a formal test.

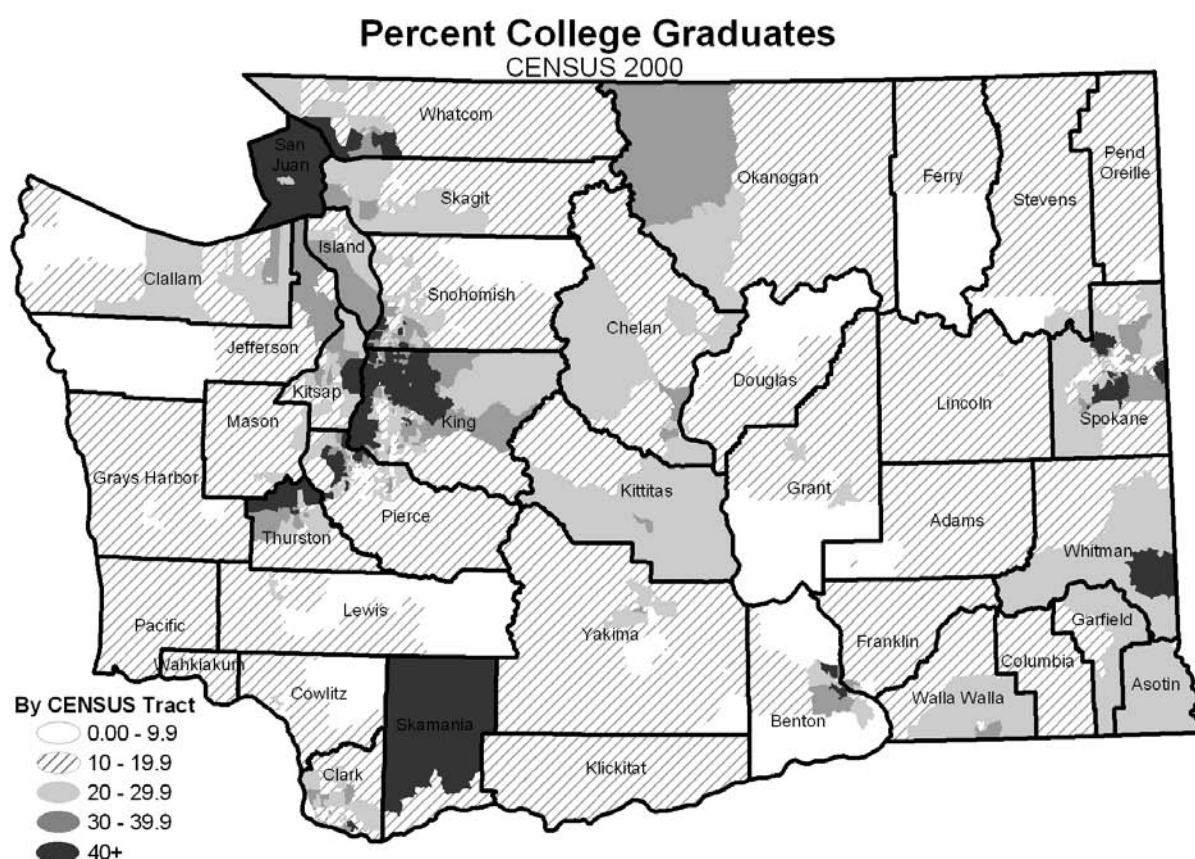
For more detailed information on confidence intervals see *Guidelines for Using Confidence Intervals for Public Health Assessment*, http://www.doh.wa.gov/Data/Guidelines/ConfIntguide.htm#tth_sEc4.7

Education (Added for the 2004 Supplement)

Researchers have consistently found a strong relationship between education and health. Persons with higher educational attainment generally enjoy better health. The reasons for this relationship are complex, but in general, people with higher levels of formal education are more likely to avoid high-risk health behaviors, to live in environments that support healthy life styles, to work in occupations with less exposure to toxins and physical hazards, and to take better advantage of medical services to prevent disease compared to people with lower levels of education. (See Social Determinants of Health, 2002 *Health of Washington State*.)

Several measures are commonly used to study the relationship between health and education, including individual years of education, whether an individual completed high school or college, and whether a person lives in a neighborhood characterized by relatively high or low educational attainment. In the 2004 Supplement to the 2002 *Health of Washington State*, we measured education as the proportion of adults, ages 25 and older, in a U.S. Census tract who had completed college.

Census tracts are small geographic areas within counties. They generally have from 2,500 to 8,000 residents. When first established, census tracts are designed to be as homogeneous as possible with respect to population characteristics, economic status, and living conditions. (U.S. Census Bureau,



Geographic Areas Reference Manual, Chapter 10,
<http://www.census.gov/geo/www/garm.html>)

To link educational attainment and health data, we first obtained records of health events (e.g., deaths, new diagnoses of cancer, new diagnoses of tuberculosis) with the address where the person lived when the event occurred coded to a census tract. We then used U.S. Census 2000 Summary File 3, Table P37 (Sex by Educational Attainment for the Population 25 Years and Over), available through American Fact Finder (http://factfinder.census.gov/home/saff/main.html?_lang=en), to assign to each record a number representing the proportion of adults, ages 25 and older, in the same census tract who had completed college. Finally, we divided people into five groups depending on the proportion in the census tract that had completed college. We selected 40% or more as the highest cut point, because that point resulted in about 20% of the total population being in the highest group. We then used cut points of 10%, 20%, and 30% to define four additional levels of education. The resulting five groups and the proportion of the Washington population in each group are as follows:

Percent College Graduates	Percent Washington Population
0 – 9.9	8.2
10 – 19.9	33.6
20 – 29.9	24.2
30 – 39.9	14.1
40 or more	19.9

Thus, education describes the general educational level of a community, which contributes to the context in which one lives. To some extent, the measure also describes individuals; an adult living in a neighborhood where a large proportion of adults have completed college is more likely to have a college degree compared to someone who lives in a neighborhood where fewer adults have completed college. Likewise, children living in neighborhoods where a large proportion of adults completed college are more likely to have parents with college educations compared to children living in neighborhoods where fewer adults completed college.

We selected a community or contextual measure of education because it is the only measure that is consistently available across the data sets used in

the 2004 Supplement to the 2002 *Health of Washington State*. For the data sets used in this supplement, only death certificate data include individual educational level. An assessment of education as recorded on death certificates indicated possible inaccuracies for education of the decedent. Specifically, the number of high school graduates and persons with some education beyond college may be over-reported on death certificates.

We specifically chose to measure the proportion of the population who has completed college, because Washington data on individual educational attainment and major risk and protective factors for health suggest that completion of college has a stronger relationship with factors related to health than completion of high school. (See Major Risk and Protective Factors, 2002 *Health of Washington State*.) Additionally, since we used a measure of low economic resources (i.e., poverty) as our economic measure in the 2004 Supplement, using a measure of high education might help to broaden perspective on socioeconomic factors.

We selected a contextual measure for education for technical reasons and not with the intent of placing relatively greater importance on the context in which one lives compared to individual factors. Health researchers debate the relative importance of neighborhood and individual characteristics in relation to health, but evidence suggests that both factors are important even though the relative importance likely differs for different health indicators.

Some researchers focus on the interaction of individual and neighborhood characteristics. For example, they might assess the effect of a high level of individual education for persons living in areas characterized by relatively low educational attainment. Other health researchers believe that one cannot really distinguish contextual from individual factors, because “People create places, and places create people.” (Kawachi I and Berkman LF Introduction. In: Kawachi I and Berkman LF editors. *Neighborhoods and Health*. New York: Oxford University Press; 2003. p. 26.) Where possible, authors provided information from the scientific literature regarding the relative importance of individual education compared to

the general level of education in the community for specific health conditions.

Geographic Variation

The maps in this report compare county rates or frequencies to the state average. Counties in darker shades have rates or frequencies above the state average, and those in lighter shades are below the state average. Counties were assigned to one of four groups using the following method:

- 1) County-specific rates or frequencies were calculated for the last three years for which data were available.
- 2) These rates or frequencies were arrayed in ascending order.
- 3) The rates or frequencies were divided into two groups based on whether they were above or below the state rate with “ties” broken by carrying out the rate calculation to as many significant digits as needed.
- 4) Each of the two groups described in step 3 were split into two equal-sized groups comprising “higher” and “lower” rates or frequencies within that group with “ties” broken as in step 3.
- 5) Because there are 39 counties, the first split always produced one group with an odd number. When doing the second split, the “extra” county was put in the group closest to the state average.

Caveats and limitations.

The rate for the state as a whole is strongly influenced by rates in the most populous counties (that is, King, Pierce, and Snohomish). If these counties have rates that are very different from the other counties, the distribution of counties can be skewed such that there are very few counties above the state rate, and most are below the state rate or vice versa.

The maps are presented to provide an indication of where counties rank in relation to the state as a whole, but in many instances there are not statistically significant differences among counties in the four groups. For counties in the lowest or highest groups, additional analysis is necessary to determine whether a health condition is more prevalent than in the rest of the state and, thus, might require additional attention.

While the general rule was not to provide rates or frequencies based on fewer than five events (see “Small Numbers” in this appendix), the maps might include some counties whose rates are based on fewer than five events. The authors used a number of strategies to minimize the potential for misinterpretation of data due to potential instability of rates based on a small number of events. Some authors simply advised caution in interpreting the map. Others did additional analysis to determine whether rates based on a small number of events showed stability over a 10-year period. If so, the author simply presented the data in the map with no statement of caution. Some authors did not include county maps, because many counties had fewer than five events.

County-level hospitalization data are unreliable for counties where a large proportion of the population uses military hospitals or hospitals in Idaho or, sometimes, Oregon (see below). On the maps, county rates were not provided for Island County because of the large proportion of people using military hospitals or for Asotin and Garfield counties because of the large proportion using hospitals in Idaho. Information on Washington residents hospitalized in Oregon is available, but cannot be always be combined with hospitalizations in Washington. (See “Hospitalization Data” in Appendix B for additional detail.) If data on Washington residents hospitalized in Oregon were not combined with Washington hospitalization data, maps do not include county rates for Clark, Cowlitz, Klickitat, Pacific, Skamania, and Wahkiakum counties.

Healthy People 2000 and 2010

Healthy People 2000 and *Healthy People 2010* are documents that provide national health promotion and disease prevention objectives. These objectives were developed under the aegis of the United States Department of Health and Human Services incorporating input from federal, state, and local agencies and extensive public comment.

This report covers topics that correspond to objectives in *Healthy People 2000* and *Healthy People 2010*. Where possible, we have provided information on whether we did or did not reach the *Healthy People 2000* goal and whether we seem to be on track in reaching the goal for 2010. The

goals in *Healthy People 2000* were first established in 1990. Some of these goals were later revised in the *Midcourse Review and 1995 Revisions*. We have noted when the goal is based on the 1995 revisions.

The reader must be careful when assessing Washington relative to the national goals. First, **many of our indicators are not identical to the indicators used in the national goals.** Some of our indicators differ from the national indicators because we do not have comparable data. For example, one of the national indicators for nutrition is the proportion of people who eat at least five servings of fruit and vegetable each day. Our information only allows us to determine the number of times people eat fruit and vegetables each day and not the number of servings. Sometimes, our indicator differs from the indicator in the *Healthy People* documents because the *Healthy People* indicators are not consistent with other national standards. For example, the *Healthy People* uses coding conventions developed by the CDC National Center for Health Statistics to establish a goal for reducing colorectal cancer deaths, while we follow conventions established by the National Cancer Institute for defining colorectal cancer deaths. **However, when we compare *Healthy People* indicators to Washington data, we used comparable definitions even though the definition might differ from that of the main indicator used elsewhere in the chapter.**

Second, ***Healthy People 2000* and *Healthy People 2010* are not always consistent with each other, because coding and other conventions have changed.** For *The Health of Washington State*, changes related to age-adjustment and the coding of mortality data are most important.

- *Healthy People 2000* age-adjusts many goals to the US 1940 standard population, while goals for the same health outcomes in *Healthy People 2010* are age-adjusted to the 2000 US standard population. In addition, *Healthy People 2000* provides goals for health-related behaviors, such as smoking and physical activity, that are not age-adjusted, while *Healthy People 2010* age-adjusts these goals.
- The coding of causes of death changed in 1999 and the new coding system is not

entirely comparable to the old system. Thus, we have 1999 and 2000 death data coded using one set of codes and a goals from *Healthy People 2000* and *2010* based on pre-1999 codes. (See Death Certificate in Appendix B.)

While we present comparable data when making direct comparisons to *Healthy People 2000* and *2010* goals, the data can differ from similar data found elsewhere in the chapter. For example, in the chapter “Alcohol and Drug Disorders,” the rate of cirrhosis deaths in 2000 is 8.7 per 100,000 age-adjusted using current conventions (that is, using the US 2000 standard population) and 6.4 per 100,000 following conventions used in *Healthy People 2000* (that is, age-adjusted to the US 1940 standard population and then adjusting for changes in the coding of cause of death).

Additional information on *Healthy People 2000* and *Healthy People 2010* is available at <http://odphp.osophs.dhhs.gov/pubs/hp2000/> and <http://www.health.gov/healthypeople/default.htm>.

Intervention Strategies

In determining what interventions are effective, authors were urged to follow the practices of the *Guide to Community Preventive Services*, <http://www.thecommunityguide.org/>. The *Guide* recommends for or against specific interventions on the basis of systematic reviews of research studies and ranks the suitability of studies as follows:

1. Most suitable: studies with concurrent comparison groups and prospective measurement of exposure and outcome
2. Moderate suitability: studies with retrospective designs or multiple pre or post measurements but no concurrent comparison group
3. Least suitable: single pre and post measurements and no concurrent comparison group OR exposure and outcome measured in a single group at the same point in time.

As a rule, authors needed to have multiple studies in categories 1 and 2 indicating the same outcome to conclude that the intervention was effective. If

they had proven interventions from studies in categories 1 and 2, they needed to consider the extent to which the intervention could be generalized to Washington’s population and the cost-effectiveness of the intervention in the real world.

In instances where there were some, but not a sufficient number of studies in categories 1 and 2 to make strong statements of effectiveness, authors might have cited interventions that look promising based on one or two category 1 or 2 studies. If studies fell into category 3 or if there were no formal studies, authors stated that there were not interventions with proven efficacy. However, if other public health authorities, such as CDC, recommended an intervention or if there were broadly accepted reasons (such as logic models supporting the intervention) for pursuing particular interventions in the absence of empirical proof of effectiveness, the authors summarized the case for such interventions. In these instances, authors were requested to be clear that the recommendations were not evidence-based, but rather represented best practices or expert opinion in areas where evidence-based interventions are lacking.

Poverty (Added for the 2004 Supplement)

There is a strong relationship between economic resources and health. Most commonly, people with more money enjoy better health, but for a few health measures, the opposite is true. The reasons for these relationships are complex, but people with more money generally are more successful in avoiding high-risk health behaviors, live in environments that support healthy life styles, minimize exposure to toxic chemicals, have experienced relatively low levels of physical violence, and are better able to take advantage of medical services to prevent disease compared to people with less money. (See Social Determinants of Health, 2002 *Health of Washington State*.)

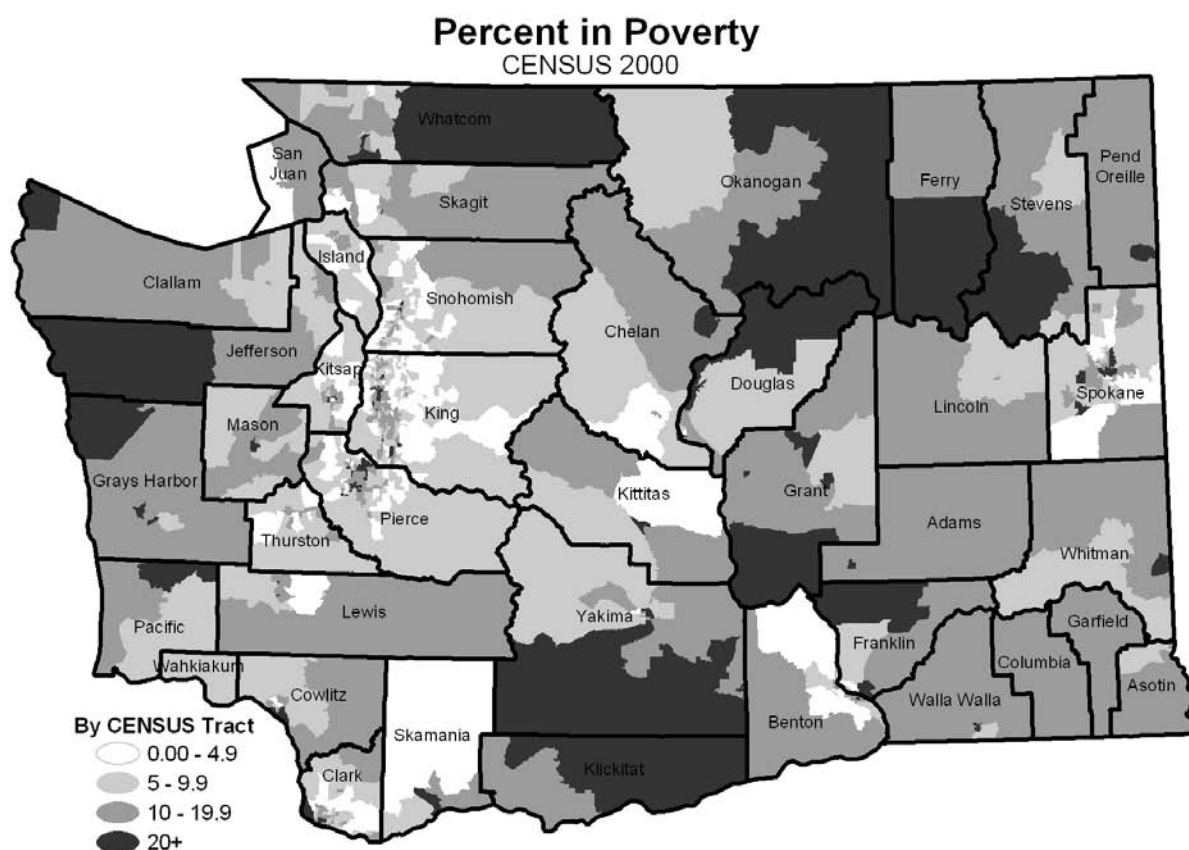
Several measures are commonly used to study the relationship between health and economic resources, including individual or household income, whether a person lives above or below the federal poverty level, or whether someone lives in a neighborhood characterized by high or low

income or poverty. Research has shown that the percent of the population living in poverty at the census tract level offers a robust measure for detecting relationships between economic factors and health. (Kreiger N, Chen JT, Waterman PD, Soobader MJ, Subramanian, SV, Carson R. Geocoding and monitoring of US socioeconomic inequalities in mortality and cancer incidence: Does the choice of area-based measure and geographic level matter? *Am J Epidemiol.* 2002; 156(5):471-82.) Thus, in the 2004 *Supplement to the 2002 Health of Washington State*, we used this metric.

Census tracts are small geographic areas within counties. They generally have from 2,500 to 8,000 residents. When first established, census tracts are designed to be as homogeneous as possible with respect to population characteristics, economic status, and living conditions. (U.S. Census Bureau, Geographic Areas Reference Manual, Chapter 10, <http://www.census.gov/geo/www/garm.html>). The proportion of the population living in poverty refers to the percent of persons in a given census

tract who live at or below the federally defined poverty line. This threshold varies by the size and ages of persons living in a household. In 2000, a household with two adults and two children with a combined income of \$17,050 was living at the federal poverty line.

To link poverty and health data, we first obtained records of health events (e.g., deaths, new diagnoses of cancer, new diagnoses of tuberculosis) with the address where the person lived when the event occurred coded to a census tract. We then used 2000 U.S. Census 2000 Summary File 3, Table P87 (Poverty Status in 1999 by Age), available through American Fact Finder (http://factfinder.census.gov/home/saff/main.html?_lang=en), to assign to each record a number representing the percent of persons in the same census tract who lived at or below the federal poverty line. Finally, we divided people into four groups depending on the percent of persons in the census tract who lived in poverty. We used the same groupings as those described in the appendix



of Krieger et al. (Kreiger N, Chen JT, Waterman PD, Soobader MJ, Subramanian, SV, Carson R. Geocoding and monitoring of US socioeconomic inequalities in mortality and cancer incidence: Does the choice of area-based measure and geographic level matter? *Am J Epidemiol.* 2002; 156(5):471-82.) Using categorical cut points allows for comparison across geographic areas and time. Additionally, the federal government defines areas in which 20% of the population lives in poverty as federal poverty areas that qualify for programs such as urban empowerment zones and low-income housing programs. The groups and the proportion of the Washington population in each group are as follows:

Percent in Poverty	Percent Washington Population
0 – 4.9	24.4
5 – 9.9	35.1
10 – 19.9	30.0
20 or more	10.5

The percent of persons living at or below the federal poverty line describes the general economic level of people in one's nearby community and the neighborhood context in which one lives. To some extent, the measure also describes individuals; people living in neighborhoods where a high proportion of the population is poor are more likely to be poor themselves compared to people who live in neighborhoods where there is less poverty.

We selected a community, or contextual, economic measure, because individual measures are generally not available for the data sets used in the *2004 Supplement* to the *2002 Health of Washington State*. We did not select a contextual measure with the intent of placing relatively greater importance on the context in which one lives compared to individual factors. Health researchers debate the relative importance of individual economic factors compared to the economic resources of a neighborhood in relation to health. There is evidence that both factors are important, although the relative importance likely differs for different health indicators.

Some researchers focus on the interaction of individual and neighborhood characteristics. For example, they might assess the effect that individual poverty has on health for persons living

in areas with high compared to low rates of poverty. Other health researchers believe that one cannot really distinguish contextual from individual factors, because "People create places, and places create people." (Kawachi I and Berkman LF Introduction. In: Kawachi I and Berkman LF editors. *Neighborhoods and Health*. New York: Oxford University Press; 2003. p. 26.) Additionally, interventions on both the individual and neighborhood levels can help to ameliorate the generally negative effects of poverty on health. Where possible, authors provided information from the scientific literature regarding the relative importance of individual economic resources compared to community-level economic factors for specific health conditions.

Race and Hispanic Ethnicity (Updated for the 2004 Supplement)

Although there are diseases for which "race" and "ethnic group" are markers for genetic factors (such as malignant melanoma or sickle cell anemia), most scientists do not believe that race and ethnicity are biological constructs. Rather, in explaining the relationships of race and ethnicity to human health, race and ethnicity are best viewed as proxies for the effects of complex social, cultural, economic, and political factors. There are several reasons for presenting health data by race and ethnicity in *The Health of Washington State*. The primary reason is that there are differences in the rates of disease by race and ethnicity that probably reflect a variety of factors, such as socioeconomic status, cultural practices, and patterns of exposure to toxins. One of the national goals of *Healthy People 2010* is to eliminate these disparities. To achieve this goal, rates must be tracked by race and ethnicity. (See Guidelines for Using Racial and Ethnic Groups in Data Analyses, <http://www.doh.wa.gov/Data/Guidelines/Raceguide1.htm> for a more detailed discussion of these issues and references.)

The U.S. Census Bureau uses the concept of race to reflect self-identification and not to denote any clear-cut scientific definition of biological stock. As with the U.S. Census, race as collected by the systems used to generate data for this document is not intended to denote a clear-cut definition of

biological stock. For some systems, the race data reflect self-classification by people according to the race with which they most closely identify. For other systems, someone else reports the race of the person. These reports are most likely to reflect the race with which the person most closely identifies when the person reporting the race knows or knew the person well, such as when next-of-kin report race on a death certificate. At times, someone who does not know the person well makes a judgment about the person's race, such as when a health care worker records race in a medical chart without first asking the person. In these instances, the race may not represent that with which the person most closely identifies.

Ethnicity, as used by the U.S. Census Bureau, refers to "the ancestry, nationality group, lineage, or country of birth of the person or the person's parents or ancestors before their arrival in the United States." People of Hispanic or Latino ethnicity have their origins in a Hispanic or Spanish-speaking country such as Mexico or Cuba, or the Spanish-speaking countries of Central or South America. People of Hispanic ethnicity can be of any race.

Following national guidelines, most data systems currently separate Hispanic ethnicity from race. They generally first ask about Hispanic ethnicity. For example, the Behavioral Risk Factor Surveillance system asks, "Are you Hispanic or Latino?" It then asks about race.

Federal guidelines currently specify five racial categories including American Indian or Alaska Native, Asian, black or African American, Native Hawaiian or other Pacific Islander, and white. Until the 1997 revisions, federal guidelines grouped Asians and Pacific Islanders. The 1997 revisions were used in the 2000 U.S. Census, but most states, including Washington, did not adopt these conventions until 2003. Because the data presented in this report from Washington systems precede this change, we have grouped Asians and Pacific Islanders in presenting rates or frequencies by race.

Similarly, current guidelines from the federal Office of Management and Budget require that all federal systems, including the 2000 U.S. Census, allow the reporting of more than one race. These guidelines did not take effect in most states until

2003. Thus, the 2000 U.S. Census, used extensively in the 2002 *Health of Washington State* for calculating rates, allowed people to select more than one race, while the data collected by the state systems generally report only one race. When this situation arose (i.e., multiple race allowed in the population data and single race only in health data), we could not calculate rates by race.

In many instances where we could not develop Washington State data by race for the 2002 *Health of Washington State*, we provided information on differences in race from the scientific literature or from previously published Washington State reports. Readers were advised that this information needed to be interpreted with caution. Racial patterns in Washington might be different from those seen elsewhere and differences by race in previously published reports might have been due to under- or overestimating the number of people in different racial groups. Nonetheless, we included the information in the 2002 *Health of Washington State*, because relatively large differences by race were likely to reflect important disparities in Washington.

In September 2003, the National Center for Health Statistics released data that allocated people who chose multiple races on the 2000 Census to a single race. They provided similar files for 2001 and 2002, based on estimates of population growth. Additionally, Public Health – Seattle & King County used the 2000 data in combination with population counts from the 1990 U.S. Census and the Washington State Office of Financial Management to develop population counts by age, sex, and single race for 1991 – 1999. These population data allow us to develop rates for health events by race that were previously unavailable. The 2004 *Supplement* contains this new information.

For information related to the collection and use of race and ethnicity in specific data systems and for more information on the U.S. Census, the National Center for Health Statistics method for allocating people reporting more than one race to a single race, and intercensal interpolations, see Appendix B. Also see Guidelines for Using Racial and Ethnic Groups in Data Analyses, <http://www.doh.wa.gov/Data/Guidelines/Raceguide1.htm> for a more detailed discussion of these issues.

Rates

Crude Rates

A crude rate is the number of events (such as deaths) in a specified time period divided by the number of people at risk of these events in that period (typically, a state or county population). This figure is generally multiplied by a constant such as 1,000 or 100,000 to get a number that is easy to read and compare and is reported as “per 1,000” or “per 100,000.” In *The Health of Washington State* rates of infectious disease and health-related behaviors are generally reported as crude rates.

Crude rates adjust for differences in population size but not differences in population characteristics. These population characteristics also need to be considered in interpreting comparisons. For example, because death rates increase with increasing age, a county with an older population might have higher death rates just because its population is older. If this is the case, the same county would not have a higher age-adjusted death rate (see below).

Age-Adjusted Rates

Sometimes population characteristics need to be considered when comparing the health status of two groups of people, such as Washington residents and those of the US. Because many health indicators change with age, age is one of the most important characteristics to consider. We usually want to know whether our rate of disease or risk factors is higher or lower than a comparison group independent of the fact that we are older or younger than the comparison group.

Age-adjustment is a method of developing rates that eliminate the impact of different age structures in two populations. Age-adjustment also allows us to compare rates in the same population over a period of time during which the population may have aged. Age-adjusted rates are computed by multiplying the rate for a specific age group in a given population by the proportion of people in the same age group in a standard population and then adding across age groups.

Unless otherwise indicated, all age-adjusted rates in this document have been adjusted to the 2000 US standard population. While many national and state organizations currently age-

adjust to the 2000 US standard population, many older documents, including the 1996 edition of *The Health of Washington State*, used the 1940 or 1970 US standard populations. When making comparisons, readers must be careful to compare age-adjusted rates that use the same standard population. Moreover, age-adjusted rates should not be compared to rates that are not age-adjusted (i.e. crude rates). Readers should be aware that an age-adjusted rate has no absolute meaning; it is an artificial number based on a hypothetical population and is only useful for comparing with other rates calculated in the same manner.

For more information on crude and age-adjusted rates see *Guidelines for Using and Developing Rates for Public Health Assessment*, <http://www.doh.wa.gov/Data/Guidelines/Rateguide.htm>.

Small Numbers

Presentation and interpretation of statistics compiled for relatively small populations or when there are a small number of events in a population present several challenges. First and foremost, statistics developed for this report must preserve confidentiality. Breaches of confidentiality are usually more of an issue when the population for which the data are developed is relatively small.

A second concern involves interpreting data based on a small number of events irrespective of the size of the population, because random fluctuation can be relatively large when the number of events is small. For example, one more infant death is a larger percent change in an area with three deaths than for an area with 300 deaths. Because of these random fluctuations, rates based on small numbers might not be as stable as those based on larger numbers and so they can have limited predictive value. For example, knowing a rate for one year might not allow us to reliably anticipate the rate for another year if the number of cases is small. This instability makes it difficult to use rates based on small numbers for program planning or assessment. In fact, considerable caution should be used in interpreting any data where the number of events is small.

To ensure confidentiality and to provide relatively stable estimates of rates, we have combined three years of data for rates or frequencies that were

calculated for sub-populations within the state, such as when presenting state-level data by race, income, or education, and when presenting county-level data. Moreover, rates developed from population data, such as birth and death files, are generally not presented if they are based on five or fewer events. Frequencies based on sample data are presented only if there are close to 50 responses per cell. For example, to report smoking by race from the Behavioral Risk Factor Surveillance System, there would need to be at least 50 people of each race who were current smokers and 50 people of each race who were not smokers.

For additional information, see *Guidelines for Working with Small Numbers*, <http://www.doh.wa.gov/Data/Guidelines/SmallNumbers.htm>.

Trend Analysis (Updated for the 2004 Supplement)

We conducted tests of trend to determine whether rates and frequencies were increasing, decreasing, or staying the same over time. For these analyses, we used the “joinpoint” methodology developed by the National Cancer Institute. Information on this method is available at <http://srab.cancer.gov/joinpoint>.

Trend analysis for mortality data was complicated by changes in coding death certificates effective in 1999. For some causes of death data before 1999 are not comparable to data from 1999 and later. In the 2002 *Health of Washington State*, we conducted formal trend analysis for indicators using the death data only through 1998 unless otherwise noted. We then discussed mortality rates for 1999 and 2000 qualitatively as indicating a continuation or change in the trend from previous years. In some cases coding changes did not substantially affect mortality rates and the formal trend analyses included 1999 and 2000 mortality. (See “Death Certificate System” in Appendix B for more detail.) In the 2004 *Supplement*, unless otherwise noted, we conducted tests of trend for 1990 – 2002 as a continuous series, adjusting for discontinuities due to coding changes if needed.

In the 2004 *Supplement*, we presented the trend data as three-year moving averages in the charts,

but we used annual rates to determine trends and in the discussion in the text. Sources of national data presented in the trend charts in the 2002 *Health of Washington State* are either noted in the chapter or in the “National Data” sections of Appendix B.

We used also used joinpoint to determine whether rates of health conditions increased or decreased as levels of poverty and educational attainment increased or decreased.

Urban and Rural

The rates and frequencies presented under the heading “Urban and Rural” were developed using a modification of the Rural Urban Commuting Area (RUCA) codes developed by US Health Resources and Services Administration’s Federal Office of Rural Health Policy and the US Department of Agriculture’s Economic Research Service. In the RUCA system, population size and commuting patterns are used to classify census tracts on a ten-tiered continuum from rural to urban. For the Health of Washington State, we defined urban-rural using two methods.

For rates and frequencies that did not use census data, we collapsed the ZIP code approximation to the census tract RUCA codes into four categories (urban, suburban, large town, and small town/isolated rural). The assignment of ZIP codes can be viewed in Figure 5 of the Guideline cited below.

For rates that used census data, we assigned counties to urban, large town, and rural based on the proportion of the population living in different RUCA classifications. We were unable to use the ZIP code approximation to the RUCA codes, because we do not have population data based on the 2000 census by ZIP code. “Urban” includes counties where the majority of the population lived in urban core or suburban RUCAs in 1990; “large town” includes counties where most of the population lived in, or commuted to towns between 10,000 and 50,000; and “small town/isolated rural” includes counties where most of the population lived in or commuted to isolated rural areas or towns with fewer than 10,000 residents. County assignment in *The Health of Washington State* is similar to that in Figure 6 of the Guideline cited below. *The Health of*

Washington State uses the “Urban” and “Small Town/Isolated Rural” categories as seen in Figure 6, but combines “Mixed Rural” and “Large Town” due to the relatively small number of counties in these categories.

The RUCA system was last updated based on the 1990 census. We expect that the system will be updated based on the 2000 census in the fall of 2002. After that time and depending on the availability of population data at the ZIP code level, we will update the urban-rural sections of this document.

For more information, please see *Guidelines for Using Rural-Urban Classification Systems for Public Health Assessment*,
<http://www.doh.wa.gov/Data/Guidelines/RuralUrban.htm>

Appendix B: Primary Data Sources

Two types of data are presented in *The Health of Washington State*. Some data were obtained from previously published material and references for these data are in each chapter. However, most of the data were developed specifically for this report from data systems maintained by the Washington State Department of Health (DOH). Brief descriptions of the major data system used in this report follow. These include

- Behavioral Risk Factor Surveillance System
- Birth certificate system
- Cancer registry (Updated for the 2004 Supplement)
- Census population counts and intercensal estimates (Updated for the 2004 Supplement)
- Death certificate system
- Hospitalization data
- Infectious disease reporting databases
- Pregnancy Risk Assessment Monitoring System

Readers are encouraged to review this appendix carefully so they fully understand the strengths and limitations of the data systems. This understanding is essential for interpreting data from these sources.

Behavioral Risk Factor Surveillance System (BRFSS)

Description of the System

- **Purpose:** To provide indicators of health risk behavior, preventive practices, attitudes, health care use and access, and prevalence of selected diseases in Washington
- **Coverage:** English-speaking adults age 18 years and older in households with telephones; sample size was 3,584 in 2000
- **Years:** 1987-present; annual data generally available six months after the close of the calendar year

- **Data Elements (examples):** health-risk behaviors (smoking, physical inactivity, nutrition); use of preventive services (cancer screening); use of health care; attitudes about health-related behavior; socio-demographics (age, income, education); health conditions (asthma, diabetes)
- **Reporting System:** Data are gathered from a randomly selected sample of adults living in households with telephones. Interviews are conducted in English by a survey firm under contract to DOH following survey administration protocols established by CDC. The questionnaire includes core questions used by all states and questions on topics of specific interest to Washington. The BRFSS is supported in part by a cooperative agreement with the Centers for Disease Control and Prevention, U58/CCU002118-1 through 16 (1987-2002).
- **Data Quality Procedures:** Survey administration procedures (e.g., call-backs to difficult-to-reach households) are used to improve the representativeness of the sample, efforts are made to achieve response rates recommended by CDC, and computer-assisted interviewing is used to minimize errors by interviewers. CDC does cognitive testing on all questions and has assessed many, but not all, of questions for reliability and validity. Interviewers are trained professionally, and calls are monitored regularly.

Issues Related to Race and Ethnicity

- BRFSS respondents are asked to identify their race and ethnicity by answering two questions: “Are you Hispanic or Latino/a?” and “Which one or more of the following would you say is your race? White, Black or African American, Asian, Native Hawaiian or Other Pacific Islander, American Indian, Alaska Native or something else?” Before 2000, one race was recorded. Beginning in 2000, up to five races can be recorded.
- Some racial and ethnic groups are underrepresented because fewer households

have telephones or fewer households speak English. (See “Caveats.”)

Caveats

- The response rate for the BRFSS has changed from 61% in 1995 to 44% in 2000. Similar changes have been seen in all other states and in other telephone surveys. The drop is due to a combination of people being less willing to cooperate and new technology allowing people to screen phone calls. CDC has assessed the impact of low response rates and has concluded that as long as the response rate is between 30% and 80%, the results are not biased due to response rate.
- BRFSS might under-represent poorer, more mobile, and non-white populations because they are less likely to live in homes with telephones. For example, based on 1990 census data, the mean income for household with telephones was \$37, 613 and the mean income for households without telephones was \$15,650. Moreover, 3.1% of whites did not have a phone compared to 8.3% of non-whites. (See *Washington State Population Survey—Characteristics of Households With and Without Telephones: Analysis with 1999 Census Data*, <http://www.ofm.wa.gov/ResearchBriefs/brief001.pdf>.)
- BRFSS does not represent people who do not speak English.
- BRFSS does not represent people who live in institutions.
- Characteristics of people who refuse to participate are unknown.
- Health risk behavior might be underestimated because people might be reluctant to report behaviors that others might not find acceptable.
- Use of preventive services might be underestimated because of recall error.
- Separate analyses of subpopulations that are too small (e.g., some racial/ethnic groups, some counties) are not possible with the statewide sample.

Best Uses

- Provide estimates of the prevalence of health risk behaviors, use of preventive services, use of and access to health care, prevalence of selected health conditions and attitudes
- Examine trends in risk behavior, use of preventive services, and other regularly measured indicators
- Compare local (large counties or groups), state, and national BRFSS data
- Investigate correlates of health risk behavior, health care utilization, and other indicators and compare subgroups
- Identify high risk groups

National Data

- Unless otherwise noted, the national BRFSS data used in The Health of Washington State are from CDC Division of Adult and Community Health, Behavioral Risk Factor Surveillance System Online Prevalence Data, <http://apps.nccd.cdc.gov/brfss>.

For Further Information

Washington State Department of Health, Center for Health Statistics (360) 236-4322.

Washington State BRFSS web site, http://www.doh.wa.gov/EHSPHL/CHS/CHS-Data/brfss/brfss_homepage.htm.

Birth Certificate System

Description of the System

- **Purpose:** To establish legal rights associated with birth, paternity, and adoption; to provide public health information about births and newborns
- **Coverage:** All births in Washington including those for Washington residents who give birth in other states; estimated to be more than 99% complete
- **Years:** Paper records: 1907-1991; computerized records: 1968 – present; annual data generally available eight to ten months after the close of the calendar year
- **Data Elements (examples):** date of birth, gender, race/ethnicity, place of residence,

place of birth, zip code of residence, maternal and paternal education, prenatal care, smoking, method of delivery, birth weight, congenital anomalies, medical risks, obstetric procedures, complications

- **Reporting System:** The Electronic Birth Certificate (EBC) system was implemented in 1992. With this system, hospitals and birth attendants can enter legal and confidential patient information required for the birth certificate directly into an automated information system. Approximately 99% of birth records are filed electronically with the remaining one percent filed as paper forms.
- **Source of Information:** Medical records; worksheets completed by patients
- **Classification and Coding:** Classification and coding of data on Washington birth records follow the National Center for Health Statistics (NCHS) guidelines as defined in Vital Statistics Instruction Manuals parts 1-20 (Published by US Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Health Statistics, Hyattsville MD).
- **Data Quality Procedures:** DOH provides hospital staff and birth attendants with instruction manuals and training in the completion of the birth certificate and in the use of the electronic system. Data profiles are used to show hospitals how they compare to the state for selected items. Data quality procedures include range of value checks, internal consistency edits, mandatory data entry fields, and checks for consistency in trends over time. Hospitals and birth attendants are queried about possible errors or incomplete information. Formal affidavits are required to change the record for paternities, adoptions, or corrections.

Issues Related to Race and Ethnicity

- Birth certificates use open-ended reporting of race, allowing for multiple racial entries. However, the multiple race data have not been used in this report because they are of uncertain quality and completeness. One analysis conducted by the Washington State

Center for Health Statistics found that approximately 2.7% of mothers reported more than one race. This is lower than the census figure of 3.7%. In general, we would expect the mothers to report more than one race more often than census respondents because they are younger and younger people report more than one race more often than older people. For analysis purposes, the first race given is assigned as the person's race.

- Race and Hispanic origin of the mother and father are collected by asking the mother for the information. Since 1989, the standard for tabulating data has been to use the race of the mother. In earlier years, tabulations used a child's race calculated from the parents' race by a defined algorithm. The change was made because most of the health information on the certificate pertains to the mother and because of the increasing number of births where the father's race is missing.
- Hispanic origin was added as an ethnic category in the vital records system and collected as a separate item (in addition to race) in 1988. Sometimes, people of Hispanic origin list their race as other or write in Hispanic. National guidelines require that people reporting Hispanic as a race be counted as white. Approximately 15% of births coded as white are to mothers who report their race as Hispanic.
- In a few instances, the Hispanic ethnicity question is marked unknown, and Hispanic is given as the person's race. Beginning in 1992, if a person's ethnicity is marked as unknown and his/her race is given as Hispanic, that person's ethnicity is counted as Hispanic. Only about ten births are reclassified in this way each year, resulting in a 0.1% difference in the number of Hispanics at birth.

Caveats

- Health risk behavior during pregnancy (e.g., alcohol or tobacco use) is likely to be underestimated because this information is self-reported.
- Differences between counties in adverse birth outcomes could reflect incomplete extraction

of information from medical records by some hospitals.

- Prenatal care can be under-reported if hospital staff is unfamiliar with a patient's history.

Best Uses

- Provide information on all births to Washington residents and all births occurring in Washington
- Examine trends in natality over time
- Compare local, state, national, and international trends
- Compare population subgroups (e.g., race, age of mother)
- Combine with induced abortion data to produce pregnancy statistics
- Use as the denominator for infant mortality statistics
- Investigate factors that affect birth outcomes

National Data

- Unless otherwise noted, the national birth certificate data used in The Health of Washington State are from the National Vital Statistics Reports published annually by the National Center for Health Statistics (NCHS). These reports are available in PDF format or can be ordered from the NCHS website. <http://www.cdc.gov/nchs/>

For Further Information

Washington State Department of Health, Center for Health Statistics, (360) 236-4323

Washington State Department of Health, Center for Health Statistics Birth Page, http://www.doh.wa.gov/EHSPHL/CHS/CHS-Data/birth/bir_main.htm

Cancer Registry (Updated for the 2004 Supplement)

Description of the System

- **Purpose:** The Washington State Cancer Registry (WSCR) monitors the incidence of cancer in order to understand, control, and reduce the occurrence and burden of cancer in this state (RCW 70.54.230).

- **Coverage:** All residents of Washington including those diagnosed and treated in other states; estimated 95% complete
- **Years:** Data collection began in 1991, but the first complete year of reliable data is 1992. Annual data are generally available 18 months after the end of a calendar year.
- **Key Data Elements:** Year of diagnosis, age, gender, race, type of cancer (site), stage at diagnosis, first course of treatment, treatment facility, and county, ZIP code, and census tract of residence; detailed clinical information such as histology, nodal involvement, and tumor size also available
- **Reporting System:** Cancer cases are collected through a combination of contracts with two regional tumor registries (the Cancer Surveillance System of the Fred Hutchinson Cancer Research Center and the Blue Mountain Oncology Program) and cases from independent reporting facilities (such as hospitals and clinics) with in-house cancer registry programs. Contractors and reporting facilities obtain reports of cases from hospitals, pathology laboratories, ambulatory surgical centers, and physicians; abstract information from the reports; and report to the state registry. Thirty other states including Idaho and Oregon report Washington cases to WSCR.
- **Classification and Coding:** The cancer reporting rules (246-102 WAC) define reportable cancers as "any malignant neoplasm, with the exception of basal and squamous cell carcinoma of the skin." Cancer in situ (that is, a cancer that has not yet spread to surrounding tissue) except cancer in situ of the uterine cervix is also included. Record format in WSCR follows the North American Association of Central Cancer Registries (NAACCR) standards. International Classification of Diseases for Oncology, Second Edition (ICD-O-2) codes are used in reporting the primary site, histology, and behavior. Stage at diagnosis is coded using the National Cancer Institute's Surveillance Epidemiology and End Results guidelines for General Summary Stage.

- **Data Quality Procedures:** DOH staff perform quality assurance activities including standardized computer edits, review of a statistical sample of records to determine the accuracy of data items such as race and ethnicity, and hospital audits to determine the completeness of case finding and the accuracy of data abstraction and coding. In addition, DOH links the annual death file with records in the cancer registry to assure that all Washington residents who died from cancer are appropriately included in the registry. DOH staff provides training to hospital staff on data standards and appropriate methods for documenting data items. The North American Association of Central Cancer Registries and the CDC National Program of Cancer Registries audit the data annually. The state registry is generally awarded the highest level of accuracy and completeness by these organizations.

Issues related to Race and Ethnicity

- Information on race and Hispanic ethnicity are abstracted from the medical record and reported to WSCR. However, using information from the medical record alone historically resulted in underreporting of American Indian and Alaska Native race and Hispanic ethnicity. Therefore, additional processes are used for these groups. To increase appropriate recording of American Indian and Alaska Native race, WSCR links its records with records from the Indian Health Services and the Northwest Portland Area Indian Health Board. WSCR utilizes two standard practices to insure the appropriate recording of Hispanic ethnicity: (a) direct contact with health care providers in targeted geographical areas and (b) the application of a Hispanic surname algorithm to all records followed by verification with the reporting source.
- Since 2000, WSCR has allowed for the reporting of more than one race, but only approximately 0.3% of current WSCR records have more than one race. Following standards for the North American Association of Central Cancer Registries, WSCR records reporting two races are assigned to the non-white race or

to the first race recorded if both races are non-white. When more than two races are recorded, the first non-white race is selected

- Comparisons of race and ethnicity between WSCR and the death files suggest that American Indian race and Hispanic ethnicity are underreported in WSCR. Thus race data are considered reliable for Asians and Pacific Islanders, blacks, and whites only. (See “Cancer by Race” in the WSCR 1998 Annual Report, <http://www3.doh.wa.gov/WSCR/HTML/WSCR1998RPT.SHTM>).

Caveats

- Inaccurate, poorly defined, or out-of-date reporting of some information abstracted from medical record, such as patient ethnicity, occupation, and delayed treatment
- Data for American Indian and Alaska Native race and Hispanic ethnicity, likely not comparable to national cancer incidence data
- Data not collected for non-invasive cervical cancer and non-melanoma skin cancer
- Limited ability to monitor the impact of interventions aimed at primary prevention because cancer usually takes a long time to develop and be diagnosed
- Limited ability to assess perceived clustering of cancer in communities, because most cancer takes a long time to develop and the number of cases is usually relatively small

Best Uses

- Examine trends in cancer incidence
- Compare cancer incidence to mortality trends
- Compare local, state, and national trends
- Compare population subgroups
- Investigate spatial patterns and correlates
- Assess discrepancies in treatment and screening practices

National Data

- Unless otherwise noted, national incidence data were developed by DOH using SEER*Stat 4.0, released April 2001 by the

National Cancer Institute. The data include cancer incidence from 11 SEER sites across the US and represent estimates of national incidence rates. More information about SEER is available at <http://seer.cancer.gov/>.

For Further Information

Washington State Department of Health,
Washington State Cancer Registry (360) 236-3676
or 1-888-302-2227.

Washington State Cancer Registry,
<http://www3.doh.wa.gov/WSCR/>

Census and Intercensal Interpolations (Updated for the 2004 Supplement)

Population data in the *2002 Health of Washington State* are from the U.S. decennial census for 1980, 1990, and 2000. Population data for 1981 – 1989 and 1991 – 1999 are called intercensal interpolations. These are provided by the Washington State Office of Financial Management (OFM) Forecasting Division and include population counts by age, sex and county, but not by race and ethnicity. Population data in the *2004 Supplement* are from the U.S. Census for 1990, the National Center for Health Statistics (NCHS) bridged race population counts for 2000, 2001 and 2002, and Public Health – Seattle & King County (PHSKC) intercensal interpolations for 1991 – 1999. The accuracy of the OFM, NCHS, and PHSKC population counts depend to a large extent on the accuracy of the U.S. Census, because the U.S. Census provides the foundation from which they were developed.

Description of the System

- **Purpose:** The United States Constitution mandates a count of people living in the United States every 10 years to determine how many seats each state will have in the US House of Representatives. The US census is also used for political redistricting, distribution of federal and state funds, and other governmental needs. The primary purpose of intercensal interpolations is to provide a count of people in Washington between the decennial censuses. Both the US census counts and the Washington intercensal estimates are also used by many other entities for a diversity of purposes, such as the

denominator for calculating rates of health events.

- **Coverage:** The US census attempts to count everyone living in Washington on April 1st of the census year. In March 2001, the US Census Monitoring Board reported that approximately 98.5% of people living in Washington in April 2000 were counted in the 2000 census. Nationally, the Board estimated that 98.8% were counted. For discussions of accuracy and undercounts, see <http://www.cmbp.gov/> or <http://www.cmbc.gov/>.
- **Years:** US census: 1980, 1990, 2000; OFM intercensal interpolations: 1981 – 1989, 1991 – 1999; NCHS bridged race: 2000, 2001, 2002; PHSKC intercensal interpolations: 1991 – 1999.
- **Key Data Elements:** US census: age, gender, race (more than one race allowed for 2000 census); OFM intercensal interpolations: age, gender; NCHS bridged race: age, gender, single race; PHSKC intercensal interpolations: age, gender, single race.
- **Reporting System:**
US Census: The Bureau of the Census located in the Department of Commerce, develops and mails census questionnaires to all known addresses where people might live including housing units and other places, such as hospitals and hotels, the United States, Puerto Rico and other US territories. Information is gathered by a *short form* sent to five out of six housing units and a *long form* sent to the remaining addresses. The short form asks basic questions, such as name, age, gender, and race of everyone in the household. The *long form* includes the questions on the short form, additional demographic questions, such as income and education, and questions about housing. Census takers visit housing units in rural and remote areas to drop off and pick up forms and visit housing units that do not return census forms. Census workers also stage a one day operation to obtain information on homeless persons and others who might be missed in the traditional enumeration of housing units and group quarters.

- **Intercensal interpolations:** OFM develops the intercensal interpolations using information from the decennial censuses, annual data on the number of births and deaths in Washington, and a variety of other data, such as housing starts, to estimate migration into and out of Washington. More information on how these estimates are developed is available at www.ofm.wa.gov/pop/annex/process/overview.pdf.
- **NCHS bridged race population counts:** The NCHS developed population data for 2000 in which people who chose more than one race in the 2000 U.S. Census were apportioned to a single race. The apportionment was based on National Health Interview Survey data. From 1997 – 2000, 4,898 survey participants selected more than one race in response to “What race do you consider yourself to be? Please select one or more of these categories [on a flashcard that had been handed to them].” Almost 4,000 of these people selected a single “primary” race when asked, “Which of these groups would you say best represents your race?” NCHS describes their method in detail in Vital and Health Statistics, Series 2 Number 135, *United States Census 2000 Population With Bridged Race Categories*, September 2003, available at http://www.cdc.gov/nchs/data/series/sr_02/sr02_135.pdf. NCHS developed bridged race population counts for each state and county in the U.S. We used single race population counts in the *2004 Supplement*, because other data sources used in this document do not reliably record more than one race.
- **PHSKC intercensal interpolations:** PHSKC estimated the number of people in each single race, age and sex group for 1991 – 1999. They first developed counts for each year by race, sex and age group using linear interpolation between the counts in the US 1990 Census and the 2000 NCHS bridged race population data. They then adjusted these counts to OFM’s intercensal interpolations described above. In this way, the age by sex component of PHSKC’s intercensal interpolations are consistent with OFM’s intercensal interpolations. These estimates were produced on the county level and aggregated to the state totals used in this report.
- **Data Quality Procedures:** US census data are subject to quality procedures employed by the US Census Bureau prior to release. These procedures evaluate the completeness of the count, try to remove individuals who have been counted more than once and make other adjustments required for an accurate count. More information on data quality can be found at http://www.census.gov/pred/www/eval_top_rpts.htm#COLLECTION. Information on data quality procedures used in developing the intercensal estimates is available at www.ofm.wa.gov/demographics.htm#april. The Washington State Department of Health and Public Health – Seattle & King County assessed the accuracy of the Washington bridged race population counts developed by NCHS. We developed an algorithm to apportion people who reported more than one race to a single race group based on surveys in Washington in which people who reported more than one race were asked how they would described themselves if asked for a single race only. (<http://www.doh.wa.gov/Data/Guidelines/Raceguide3.htm#Converting>) The population counts developed using this algorithm are very similar to those provided by NCHS.

Issues related to Race and Ethnicity

- The 2000 census first asked people whether they were Hispanic or Latino/a. People were then asked to identify themselves as belonging to one or more racial groups as follows: “white; Black, African Am. or Negro; American Indian or Alaska Native;” and 11 other groups that the census generally classifies as Asian or Native Hawaiians and other Pacific Islanders in their reports. The 1980 and 1990 asked people to identify themselves as belonging to only one racial group, used somewhat different terminology in describing racial groups, combined the Asian and Pacific Islanders into one group and asked about race first and then about whether the person was Hispanic.

- The 1991 – 1999 intercensal interpolations from OFM do not include race and ethnicity.

Caveats

- In the *2002 Health of Washington State*, we did not have single race data from the 2000 census and so we were unable to develop rates by race for some health events such as death, cancer incidence, and infectious disease. With the release of the NCHS bridged race population counts, we provided this information in the *2004 Supplement*.
- In the absence of other information, the single-race intercensal estimates for 1991 – 1999 assumed linear increases in the number of people in a specific race, age, and sex category between 1990 and 2000. This assumption should be revisited if new data (such as OFM intercensal single-race estimates) become available.
- Although the Census Bureau attempts to obtain information from every known household, homeless persons, undocumented persons who deliberately avoided the census for fear of disclosure to the Immigration and Naturalization Services, urban poor living over commercial addresses, and others are undercounted by the census. The undercount is larger for some groups than for others. For example, an April 4, 2002 memorandum from the Census Bureau (DSSD Revised A.C.E. Estimates Memorandum Series PP-2) estimates that Native Hawaiians and Other Pacific Islanders are undercounted by almost 5% and American Indians by approximately 3%. The undercount might also affect some geopolitical jurisdictions more than others. In general, the smaller the group, the greater the potential for the undercount to be relatively large. (There is also a small group of people who were counted more than once resulting in an overcount. We do not have information on overcounts in Washington, but the national estimates are relatively small, i.e. less than one half of one percent for whites and Asians.)
- The 2000 census only allowed reporting of up to six people per household and so large households may not have included everyone.
- College students are usually enumerated in the towns in which they attend college, although their health events might be reported at their parents or guardians. This has implications for several counties in Washington.
- People who are confined in institutional group quarters, such as mental hospitals and prisons, are reported separately and these numbers are not included in the population counts used in this document. This may affect rates of health events among some age and race groups with disproportionately high rates of incarceration.
- Due to reporting rules for active military personnel, some Washington jurisdictions might have military personnel who do not actually reside in those jurisdictions counted as part of the population. This phenomenon might affect rates of some conditions in counties with a high proportion of people who are active military.
- Although ZIP code is commonly collected as a geographic identifier by health data systems, 2000 census data by ZIP code was not available while this document was being written.
- Because population counts by single race group for 2001 and 2002 were not available when we began developing the *2004 Supplement*, we have used 2000 population counts with health events from 2001 and 2002. Most likely, the number of people in all race and ethnic groups is increasing. Thus, using 2000 population counts for 2001 and 2002 rates, underestimates the number of people at risk for a health event and artificially inflates the rate. While some groups might be growing faster than others, differential growth over 2001 and 2002 is unlikely to have a large impact on our ability to discern differences among different race and ethnic groups.

Best Uses

- Provide information on the number of people by age and sex living in Washington.
- Provide information on the number of people by age and sex living in counties and smaller geographic areas, including census blocks, block groups and census tracts.

For Further Information

US Bureau of Census Website:
<http://www.census.gov> .

Washington State Office of Financial Management
(OFM) <http://www.ofm.wa.gov> .

Death Certificate System

Description of the System

- **Purpose:** To establish legal benefits; to provide public health information
- **Coverage:** All deaths in Washington and those of Washington residents who die in other states; estimated 99% complete
- **Years:** Paper records: 1907-present; Computerized records: 1968 – present; annual data generally available eight to ten months after the close of the calendar year
- **Data Elements (examples):** age, gender, race/ethnicity, date of death, underlying and contributing causes of death, place of residence, place of occurrence, zip code of residence, occupation, education
- **Reporting System:** Demographic information is gathered by the funeral director; cause of death is reported by the attending physician or the coroner/medical examiner. Certificate is filed with the local health jurisdiction, retained for about 60 days for local issuance purposes, then filed with DOH.
- **Classification and Coding for Causes of Death** Classification and coding of data on Washington death records follow the National Center for Health Statistics (NCHS) guidelines as defined in *Vital Statistics Instruction Manuals* parts 1 – 20 (Published by US Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Health Statistics, Hyattsville MD). Causes of death are coded according to the International Classification of Disease, World Health Organization, Eighth Revision (ICD-8) for 1968 – 1978; Ninth Revision (ICD-9) for 1979 – 1998; Tenth Revision (ICD-10) for 1999 and later.

- **Data Quality Procedures:** Instruction manuals are provided to physicians, coroners, and medical examiners, as well as local health jurisdictions and others involved in completing and managing death certificates. Edits and a physician query system are used to check for internal consistency and logic/completeness of cause of death.

Issues Related to Race and Ethnicity

- Death certificates use open-ended reporting of race, allowing for multiple racial entries. However, the multiple race data have not been used in this report because they are of uncertain quality and completeness. The determination of race when more than one race is reported follows decision rules established by the National Center for Health Statistics (NCHS). In most cases, the first race given is assigned as the person's race.
- Hispanic origin was added as an ethnic category in the vital records system and collected as a separate item (in addition to race) in 1988. Prior to 1988, Hispanic data were provided by a racial category of "Mexican/Chicano" or "Mexican American."

Following national guidelines, people who report Hispanic ethnicity and other or Hispanic as a race are counted as white. In 2000, 589 or 1.4% of all white deaths had race classified using this guideline.

In a few instances, Hispanic ethnicity is marked unknown, and Hispanic is given as the person's race. Beginning in 1992, if a person's ethnicity is marked as unknown and his/her race is given as Hispanic, then that person's ethnicity is counted as Hispanic. About 60 deaths each year are reclassified in this way. However, the increase results in a 14% increase in the number of Hispanics at death.

- Reporting of race/Hispanic origin on death certificates is sometimes based on observing the decedent rather than questioning the next of kin. This procedure causes an underestimate of deaths for certain groups, particularly Native Americans, some of the Asian subgroups, and Hispanics. Thus, death rates based on death certificate data are lower than

true death rates for these groups. See caveat below for more information.

Caveats

- Unless otherwise noted, the mortality rates in *The Health of Washington State* use the underlying cause of death. For example, if a person dies of a brain tumor that has spread to the brain from a tumor in the breast, the underlying cause is reported as breast cancer. Likewise, if a person dies of pneumonia as a complication of a stroke, the underlying cause of death is reported as a stroke.
- Death rates can underestimate the magnitude of certain public health problems for deaths that might be under-reported due to social stigma (such as AIDS and suicide) or that diminish the quality of life, but are not fatal (such as chronic alcoholism).
- The number of deaths in certain racial subgroups (such as Asians and Native Americans) and for people of Hispanic origin might be underestimated because of the misclassification of deaths for some people in those groups to white, non-Hispanic. See *Quality of Death Rates by Race and Hispanic Origin: A Summary of Current Research, 1999*, http://www.cdc.gov/nchs/products/pubs/pubd/series/sr02/130-121/sr2_128.htm.
- Differences in causes of death between counties could reflect cause of death reporting practices by local physicians, coroners, or medical examiners.
- Revisions in ICD codes create a discontinuity in trends that must be accounted for when comparing mortality rates between time periods using different revisions. In this document, mortality rates from 1980 – 1998 are coded following the ICD-9. Mortality rates for 1999 and 2000 are coded following the ICD-10. Ratios of the number of deaths recoded using ICD-10 to the number originally coded using ICD-9 (obtained from a study of a large sample of 1996 US deaths) can assist when trying to determine whether a trend noted in the 1980 – 1998 period has continued in 1999 and 2000. The ratios are called comparability ratios. For more

information, see *Washington State Department of Health Center for Health Statistics ICD-10 Information Page*

(http://www.doh.wa.gov/ehsphil/chs/chs-data/death/dea_icd.htm) or *Comparability of Cause of Death Between ICD-9 and ICD-10: Preliminary Estimates*

(http://www.cdc.gov/nchs/data/nvsr/nvsr49/nvsr49_02.pdf).

- Because of revisions in the ICD codes, we multiplied 1998 death rates by the comparability ratios (see above) to develop three-year averages for 1998 – 2000.

Best Uses

- Represent entire population of the state
- Examine trends in mortality over time
- Compare local, state, national, and international trends with comparable data
- Compare population subgroups (e.g., race, age, gender, occupation)
- Investigate spatial patterns and correlates (e.g., social, environmental factors)
- Support public health surveillance in a cost-efficient manner

National Data

- National death data are available from several sources within the federal government. Sources used in *The Health of Washington State* are referenced in each chapter.

For Further Information

Washington State Department of Health, Center for Health Statistics, (360) 236-4324

Washington State Department of Health, Center for Health Statistics, Death Page, <http://www.doh.wa.gov/EHSPHL/CHS/CHS-Data/death/deatmain.htm>

Hospitalization Data

- **Comprehensive Hospital Abstract Reporting System (CHARS)**
- **Oregon Hospital Discharge Data (OHDD)**

Description of the System (CHARS)

- **Purpose:** Initially developed to monitor hospitalization rates; now used to examine trends in causes of hospitalization, create hospital-specific case-mix indices, characterize access to and quality of health care, and monitor morbidity from selected health conditions
- **Coverage:** Inpatient stays for all patients treated in state-licensed acute care hospitals in Washington, regardless of patient residence. A hospital is defined as any health care institution that is required to qualify for a license under RCW 70.41.020. CHARS does not cover private alcoholism hospitals, no-fee hospitals, US military hospitals, US veterans administration (VA) hospitals, or Washington State psychiatric hospitals. Eligible hospitals provide data for hospital units that are Medicare-approved, including psychiatry, rehabilitation, and bone marrow units.
- **Years:** Although data collection began in mid-1984, the first complete year of reliable data is 1987; annual data generally available six months after the close of the calendar year.
- **Key Data Elements:** Hospital, zip code of residence, birthdate, age, gender, length of stay, discharge status, total charges, payer, principal and secondary diagnoses, principal and secondary procedures, physician, diagnosis related groups (DRGs) and DRG relative weight, external cause of injury code, encoded patient identifier
- **Reporting System:** Hospitals abstract information from the uniform billing form, code diagnoses and procedures, and submit the information to the state contractor by tape, cartridge, or electronic file transfer within 45 days of the end of the month.
- **Classification and Coding for Causes of Hospitalization:** Reasons for hospitalization are coded according to the International

Classification of Disease, Clinical Modification of the Ninth Revision (ICD-9-CM). The reason in the first diagnosis field is considered to be the principal reason the patient was admitted to the hospital. Beginning in 1993, there are up to eight other diagnosis fields for additional conditions that had an effect on the hospitalization. Prior to 1993, CHARS allowed for the coding of up to five additional diagnoses. Separate from the diagnosis codes, CHARS also has a code that indicates the external cause of an injury or poisoning.

- **Data Quality Procedures:** The state contractor edits the data through computerized system program checks. On a quarterly basis, hospitals certify that the number of discharges and hospital charges are 95% correct. Accuracy of the diagnosis field has been assessed in several studies conducted by DOH.

Description of the System (OHDD)

- **Purpose:** In Oregon, data are collected to monitor hospitalization indices for the Oregon Health Plan. Washington obtains the data on Washington residents hospitalized in Oregon to more accurately examine trends in causes of hospitalization, access to and quality of health care, and morbidity from selected health conditions.
- **Coverage:** Inpatient hospital stays in state-licensed hospitals in Oregon
- **Years:** Washington has data on Washingtonians hospitalized in Oregon since 1988. We are generally able to obtain the OHDD within 12 months after the close of the calendar year, although we have experienced delays of several years. We currently have OHDD through 1999.
- **Key Data Elements:** Hospital, zip code, birthdate, age, gender, length of stay, discharge status, payer, principal and secondary diagnoses, principal and secondary procedures, DRGs, and external cause of injury codes
- **Reporting System:** Hospitals abstract information from the uniform billing form, code diagnoses and procedures, and submit the

information to the Oregon State Hospital Association. The Association prepares the database and releases a copy to the Oregon State Office for Health Policy and Research.

- **Classification and Coding for Causes of Hospitalization:** OHDD is similar to CHARS in that reasons for hospitalization are coded according to the International Classification of Disease, Clinical Modification of the Ninth Revision (ICD-9-CM), and there are fields for the principal and additional diagnoses. The number of fields for additional diagnoses increased from five to eight in 1995. Beginning in 1998, there has been separate coding for the external cause of an injury. However, unlike in Washington, reporting of external cause is not mandatory (see Caveats below).
- **Data Quality Procedures:** A contractor edits the data through computerized system program checks. Hospitals certify that the number of discharges and hospital charges are 95% correct.

Issues Related to Race and Ethnicity

- Neither CHARS nor OHDD collect information on the race and ethnicity of patients.

Caveats

- Although most analyses in this report are based upon the first listed diagnosis, some analyses are based upon any listed diagnosis. This is done because some conditions, such as diabetes and high blood pressure, are contributory causes of hospitalizations where they are not listed first. To gauge the full impact of a condition like high blood pressure, it is necessary to examine both “hospitalization from” the condition as well as “hospitalization with” the condition. For example, in 1999 there were 5,086 hospitalizations where diabetes was listed as principal diagnosis, but 56,485 hospitalizations where diabetes was listed as either principal or secondary diagnosis; for high blood pressure, the difference is even greater (2,061 vs. 103,910). (Data comparisons for selected diseases and injury

are in Appendix C, *The Health of Washington State 2002*.)

- Unless otherwise noted, the unit of observation is the hospitalization episode not the individual. Thus, one person hospitalized several times will be counted several times. The number of hospitalizations gives us a better picture of the public health impact of a condition. Each hospitalization for an illness or injury is an adverse event for the person who experiences it. Many hospitalizations are potentially avoidable through reductions in the factors that cause diseases and injuries or through early detection and rapid treatment. In addition, because records in OHDD do not include a patient identifier, it is not possible to count individuals when using a combined CHARS-OHDD dataset.
- The Oregon State Health Department estimates that reporting of external cause in the OHDD is approximately 60% complete. Incomplete reporting of external cause has been found in hospitalization data in other states without mandatory reporting. Therefore, we have not used external cause from the OHDD.
- Hospitalization excludes emergency room visits, outpatient surgery, outpatient clinics, military and VA hospitals (greatest impact on Island county because of the large proportion of residents connected with the military), free-standing surgeries, free standing mental health, substance abuse, and rehabilitation centers, birthing centers.
- CHARS does not contain data on Washington residents hospitalized outside of Washington. Data on Washington residents hospitalized in Oregon are obtained through the OHDD. However, hospitalization data are not available for Washington residents hospitalized in other states, and OHDD cannot always be combined with CHARS, as for example, when one wants to count individuals and not hospitalizations. This situation affects border counties, especially those adjacent to larger population centers in other states. Asotin and Garfield counties are particularly affected by hospitalization in Idaho.

- Changes in hospitalization practices or coding conventions might affect trends over time
- Residence is based on five-digit ZIP codes. In this report, ZIP codes have been assigned to county based on US postal service conventions that assign ZIP codes to counties based on the physical location of the post office. When ZIP codes cross county borders, some hospitalizations are assigned to the wrong county. This phenomenon may be most important for Skamania. ZIP code 98671 includes a large portion of Skamania, but all hospitalizations in that ZIP code are assigned to Clark County. Other counties are less affected, because the number of hospitalizations that are potentially assigned to the wrong county are a relatively small proportion of the total hospitalizations for that county.
- No race/ethnicity data collected
- Increases in the number of diagnosis fields can result in a discontinuity in trend data.

Best Uses

- Monitor hospitalizations due to relatively severe diseases (severe enough to warrant hospitalization consistently over time)
- Analyses on utilization of inpatient health care resources/medical care costs
- Analyses of source of payment
- Analyses on access to care by examining trends in potentially avoidable hospitalizations

For Further Information

Washington State Department of Health Hospital Data Page,
<http://www.doh.wa.gov/EHSPHL/hospdatamenu.htm>

Washington State Department of Health, Center for Health Statistics (360) 236-4223.

The Washington State Department of Health does not release record-level data from OHDD. For additional information on OHDD, contact the Oregon Office for Health Policy and Research at (503) 378-2422 x414.

Infectious Disease Databases

Description of the System

- **Purpose:** To monitor the incidence of selected infectious diseases and health conditions and to characterize populations at high risk for those diseases and conditions
- **Coverage:** All residents of Washington; under-reporting is an issue (See “Caveats” below.)
- **Years:** Varies depending on disease and health condition, but information on most of the current notifiable infectious diseases began in the 1980s; data generally available on an ongoing basis with annual data compiled six months after the end of a calendar year
- **Key Data Elements:** Diagnosis, age, gender, race/ethnicity, county of residence
- **Reporting System:** Following WAC 246-101, health care providers, hospitals, and labs identifying a patient with a notifiable infectious disease or condition are required by law to report the case to the local or state health department and to provide a limited amount of information about the patient. For some notifiable infectious diseases and conditions, the health department more actively seeks out cases or collects exposure information; for other diseases and conditions, there is little health department involvement other than recording cases. Legally, each disease is to be reported within a specified length of time (e.g., immediately, within a day, within seven days); however, these requirements are often not met.
- **Classification and Coding:** Standard case definitions are developed by the Council of State and Territorial Epidemiologists to enhance national comparisons over time and in different geographic locations
- **Data Quality Procedures:** Most of the diseases reported to the notifiable infectious disease database are confirmed by laboratory testing, although some case definitions are based on a health care provider’s diagnosis only.

Issues Related to Race and Ethnicity

- Racial and ethnic categories reflect reporting forms developed by the Centers for Disease Control and Prevention and are not reported uniformly for infectious diseases.
- Race and ethnicity are often not reported or are reported based on the reporter's opinion.
- Reduced access to health care facilities can result in under reporting for certain racial or ethnic groups.
- Relatively greater use of public health care facilities by certain racial or ethnic groups can result in over reporting for those groups.

Caveats

- Underestimate of the incidence of the disease/health condition because of under-detection, under-diagnosis, and under-reporting
- Inconsistent level of detection/reporting in different populations because of differences in access to health care, source of health care, and reporting effort
- Inaccurate or incomplete reporting of some information (such as race and ethnicity)
- Less serious diseases more likely to be under-diagnosed and under-reported than diseases considered severe

National Data

- Unless otherwise noted, national data on infectious disease used in *The Health of Washington State* are from the *Summary of Notifiable Diseases, United States* published annually by CDC as a supplement to the Morbidity and Mortality Weekly Report (MMWR).
<http://www.cdc.gov/mmwr/summary.html> .

Best Uses

- Examine trends in moderately severe disease (i.e., requiring a health care encounter but not necessarily leading to hospitalization or death) particularly if cases are confirmed through laboratory tests
- Characterize high risk populations
- Compare local, state, and national trends

- Investigate spatial patterns and correlates (including outbreak identification)
- Monitor impact of intervention and prevention activities because effects are seen rapidly owing to the relatively short time between exposure to a pathogen and onset of disease for most notifiable infectious diseases

For Further Information

Washington State Department of Health, Office of Epidemiology, Communicable Disease Unit at (206) 361-2914 to be directed to specific database

Washington State Department of Health, Annual Communicable Disease Reports and Tables, <http://www.doh.wa.gov/notify/list.htm>

Pregnancy Risk Assessment Monitoring System (PRAMS)

Description of the System

- **Purpose:** To supplement birth certificate data and to generate state-specific data for planning and evaluating perinatal health programs
- **Coverage:** New mothers (two to six months postpartum) who are residents of Washington and can speak either English or Spanish. Approximately 2,000 new mothers are sampled each year (overall 2.5% of all births to Washington residents).
- **Years:** 1993 – present; annual data are generally available 14 months after the close of the calendar year
- **Key Data Elements:** Age, race, ethnicity, education level, socioeconomic information, risky behaviors, health care during pregnancy, infant health care
- **Reporting System:** Participants are selected from birth certificate data using a stratified random sample that oversamples new non-white mothers and new mothers in King and Snohomish counties. Survey information is collected by mail through a self-administered questionnaire with telephone follow-up of non-responders.
- **Data Quality Procedures:** Comparisons of data from birth certificates, the First Steps

Database (Medicaid), and PRAMS have been undertaken

Issues related to Race and Ethnicity

- PRAMS uses race and ethnicity as reported on the birth certificate (see Birth Certificate System)
- PRAMS uses race and ethnicity from the birth certificate to assure that a sufficiently large number of Asian, African American, American Indian, and Hispanic mothers participate in the survey.

Caveats

- Overall response rate of 70%; lower response rates for African American and Native American mothers.
- Collection of information two to six months after delivery might impact responses to more subjective questions and limits follow-up time for outcomes
- Self-reported information is not verified through other means
- Sample design prevents analysis of data for most individual counties

National Data

- Sources for national PRAMS data used in *The Health of Washington State* are noted in each chapter.

Best Uses

- Monitor statewide trends in behavioral risks, health care, and pregnancy outcomes over time
- Correlate birth outcomes and health-related information, socioeconomic information, and behavioral risk and protective factors
- Examine impact of intervention and prevention programs

For Further Information

Washington State Department of Health, PRAMS page,
<http://www.doh.wa.gov/cfh/PRAMS/default.htm>

Listing of Washington PRAMS publications:
http://www.cdc.gov/nccdphp/drh/prams_wa.htm

Washington State Department of Health Office of Maternal and Child Health Assessment, PRAMS Coordinator, (360) 236-3576

The national PRAMS website:

http://www.cdc.gov/nccdphp/drh/srv_prams.htm.

